Coal Age

MAY, 1957

A McGRAW-HILL PUBLICATION—PRICE 50c

PREVIEW . . .
1957 COAL SHOW
American Mining
Congress:
Program
Exhibits
New Products
p 99

Preparing for Continuous Mining . . . p 70

R-4 LAMPS—Brilliant, unfailing, effective light that means added safety for the miner, added production for the mine.

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OF IMPORTANCE TO YOUR MINE SAFETY AND PRODUCTION

. . . at Booth 1009—Coal Show

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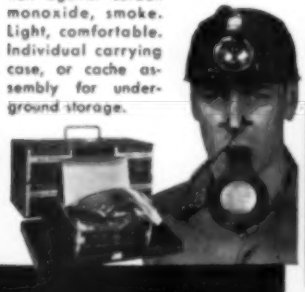

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M·S·A MINEPHONE COMMUNICATION SYSTEM—Improves haulage efficiency, safety. Messages dispatched instantly to all motormen, who can receive and reply while trips are in motion.

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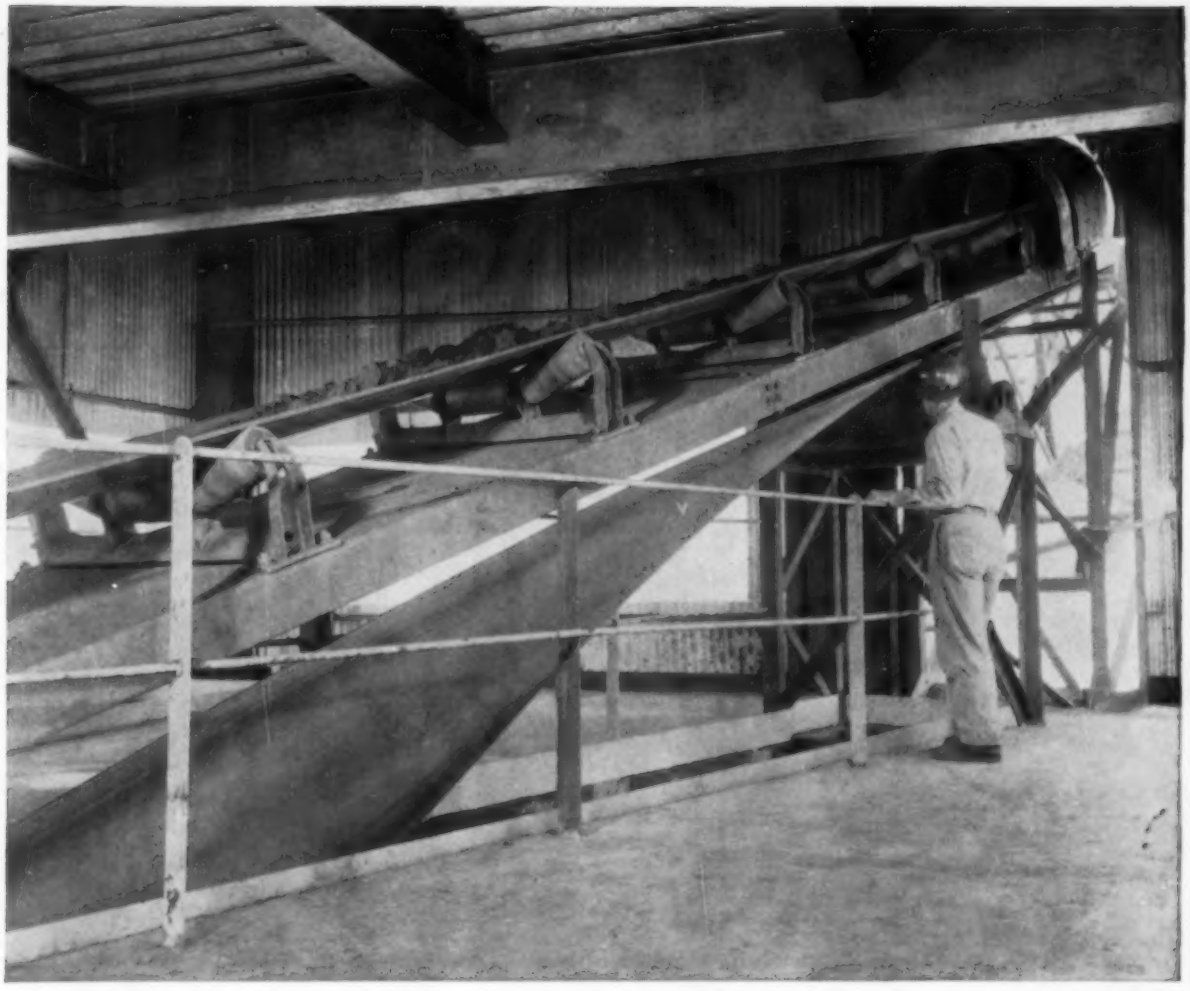
SAFETY EQUIPMENT HEADQUARTERS

B.F.Goodrich report:



Coal mine handles wet, sticky loads without damage to conveyor

Problem: That's wet, sticky refuse from a coal washing plant, riding the conveyor belt to a dumping point—550 feet uphill. When plans were drawn up, engineers knew that a regular conveyor would be a problem here. Sticky particles of clay and sand would cling to the belt, build up into gummy layers, clog the return idlers, damaging the belt cover.

What was done: To avoid this trouble, the coal company installed a new and different kind of conveyor—the B.F. Goodrich "turnover" belt system. Here's how it works. After the material is dumped off the end of the moving belt, the belt makes a 180° turn, runs empty along the return idlers, then makes another one-half turn (as shown above) before receiving the next load.

Savings: Only the clean side of the belt touches the idlers, so there's no chance for sticky materials to build up on them. Danger of belt damage is reduced because lumps of materials cannot be trapped between the belt and pulleys.

See "turnover" belt at Coal Show: You can see a working model of the B.F.Goodrich "turnover" belt at the Coal Show, May 13-16, Booth No. 1729, Public Auditorium, Cleveland, Ohio. B.F.Goodrich distributors have full information on this belt system, and can tell you how easy it is to convert a conventional conveyor into the turnover type. *B.F.Goodrich Industrial Products Co., Dept. M-935, Akron 18, Ohio.*

B.F.Goodrich

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the name to remember is

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The big blue drum with the bright red label, "HULBURT QUALITY LUBRICANTS," is found in all mines where equipment investments are closely protected by strict compliance to all maintenance recommendations.

Equipment manufacturers stress proper servicing with quality lubricants and Hulburt, the leading lubricant supplier in the coal mining industry, has proved time and time again that no other lubricants can compare in performance with Hulburt AP Greases and No. 11 lubricants.

Today, with mines operating under heavy schedules, the need for dependable lubricants is greater than ever before. For this reason, the name to remember is Hulburt—manufacturers of the quality lubricants found in the majority of the nation's mines.

Look for the blue drum with the bright red label. That's "Hulburt!"

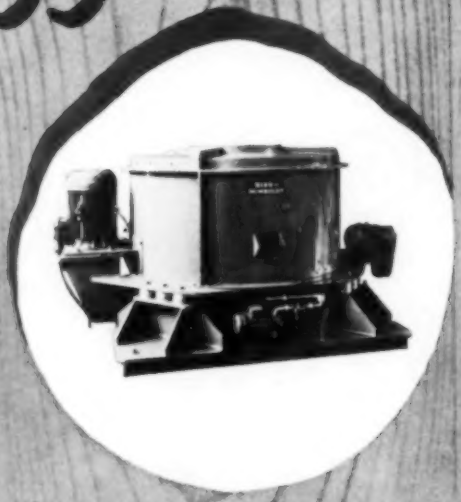
Hulburt

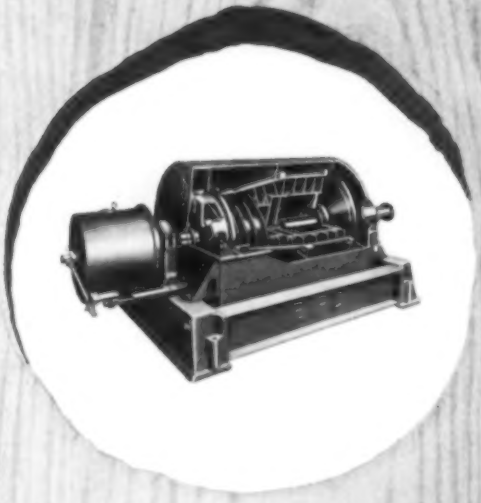
OIL AND GREASE COMPANY

Philadelphia 34, Pa.

* *Specialists in Quality Lubricants for the Coal Mining Industry*

See these BIRDS in booth 233 at the COAL SHOW





THE BIRD-HUMBOLDT SCREEN CENTRIFUGAL DRYER. A full size operating unit shows how it combines oscillating plus rotating action to deliver a continuous flow of well dewatered solids with a power cost of only ¼ kwh per ton and screen replacement cost of only ½ cent per ton.

THE BIRD CONTINUOUS CENTRIFUGAL FILTER. A full size unit cut away so you can look inside and see how it works to deliver coal as dry as can be obtained by any mechanical means, at low cost, without filter media, vacuum or auxiliaries.

NEW APPLICATIONS—we have news about uses of this solid bowl centrifuge that will interest you. Do come in and let us tell you about them.

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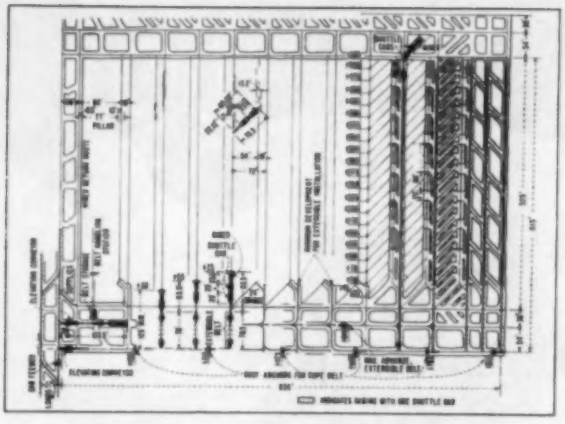
This Month in Coal Age

MAY 1957



► Continuous Mining

Preparing for Continuous Mining . . . p 70

What goes on behind the machine is as important as the miner itself. For maximum performance proper attention must be given to:

Developing a mining system that will take full advantage of machine characteristics, including proper roof support.

Providing adequate, positive ventilation.

Installing ample facilities for providing and distributing power.

Making sure that the haulage system will not handicap but rather help the machine.

Providing the proper trained manpower.

Planning for the best in maintenance.

Providing supplies when and where needed.

Highlights—"How to" layouts for mining, power, ventilation and transportation.

► Coal Reserves

How Much Bituminous East of the Mississippi? . . . . . p 78

Ivan A. Given, Editor, Coal Age

Data derived from the 1956 *Coal Mine Directory*, reprinted from *Keystone Coal Buyers Manual*, a *Coal Age* affiliate; from state and federal reports; and from information supplied by operators indicates reserves east of the Mississippi as follows:

Committed reserves, present mines, 12,580,000,000 tons, or 29 yrs at the 1955 rate.

Total reserves, present mines, 28,300,000,000 tons.

Overall reserves mineable at today's or immediate future prices, 152,000,000,000 tons.

Sidelights—Steel and strip mine reserves; how reserves are divided among producing regions and states.

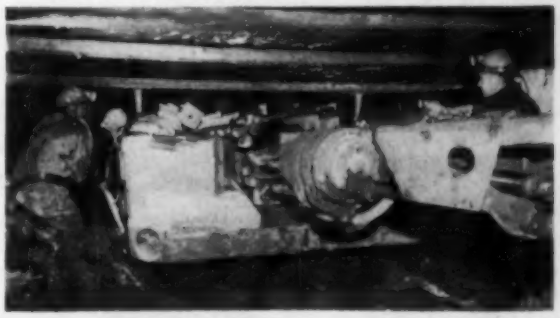
► Overburden Removal

Tandem V. Dragline Stripping . . . . . p 81

L. C. Mosley, Manager, Mining Div., Marion Power Shovel Co., Marion, Ohio.

Increasing overburden thickness is requiring new methods of removal, sometimes making the shovel inadequate by itself. However, it may still find good use in combination with a dragline. But proper operation requires full understanding of the limitations of tandem operation. When the shovel and dragline are working together, the limit which can be reached is fixed by the need for casting dragline spoil over the shovel spoil. Thus, the dragline working alone can handle thicker overburden than the combination unit.

Pointers—Pit sections showing graphically the limits that single units and combinations can attain in stripping.



► Machine Mining

Maxine Mine Triples Output . . . . . p 84

Continuous miners and conventional equipment share the production load in the variable America seam at Alabama's largest mine. Skillful planning of the original

(*Continued on page 7*)

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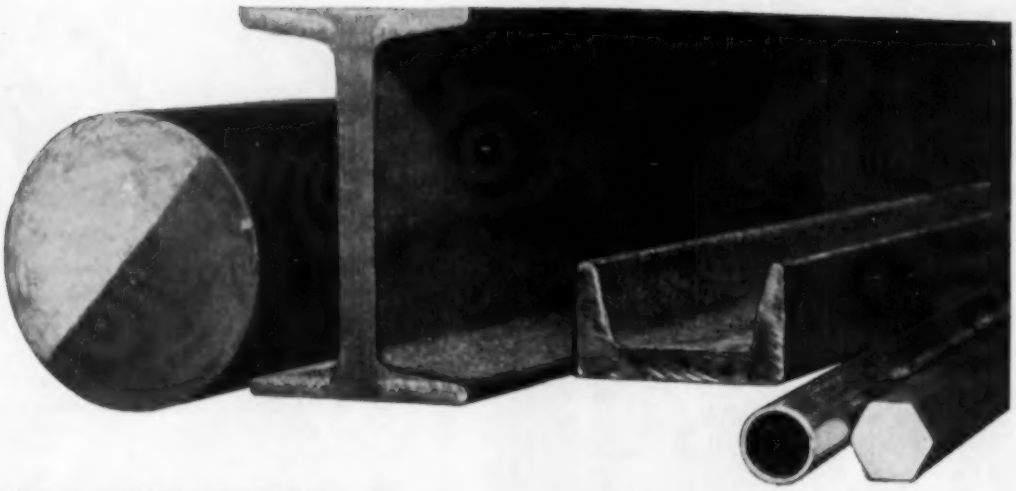

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3 major reasons keep them coming to Ryerson:

Flame-cut steel shapes save you money—one piece or hundreds—almost die-cut accuracy.

1. Biggest stocks—nobody comes even close to the size and variety of Ryerson inventories.

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slope mine and preparation plant permitted rapid expansion to 1,548,000 tons of clean coal a year. Continuous miners produce an average of 400 tons of raw coal per shift in entry development, and conventional units mine 525 tons per shift in rooms.

Sidelights—Spare sections for maintenance, belt extensions, moves or major breakdowns; raw- and clean-coal stockpiling to permit independent operation of mine, cleaning plant or barge-loading facilities.

►Ohio Stripping

Larger Units . . . Better Stripping . . . p 92

Terramanna Bros. Coal Co., Steubenville, Ohio, selects a large stripping unit to cut overburden removal expense and thus offset rising costs in other phases of operation. Result, a 20% reduction in stripping cost. Methods include cuts perpendicular to the highwall in finishing up on inside curves. Advantages are increased spoil room and less backfilling. Also, hilltop deposits are recovered by cuts perpendicular to the ridge line for complete recovery and better spoil disposal.

Added Idea Starter—Pit-drainage pumps mounted on jeeps and driven by jeep engines for high-capacity portable pumping service.

►Safety

Report on the Bishop Explosion . . . . p 96

The explosion at Bishop mine the early morning of Feb. 4 caused the deaths of 37 men, approximately one-third as a result of carbon-monoxide poisoning. Official reports indicate the cause as interruption of ventilation, with an electric arc as the ignition agent. Rock dust limited the spread. Among the recommendations to prevent a repetition and cut down the loss of life if an explosion should occur is the use of self-rescuers. Good ventilation and keeping permissible equipment permissible was emphasized.

(*Continued on p 11*)

This Month in Coal

ADDED POSSIBILITIES—In addition to the tonnage normally to be expected from a high level of business, the prospects for new business brightened steadily. New markets were one of the possibilities. One in particular is the subject of a quiet but thorough investigation. If this investigation bears out the promise, the announcement will be made well before the end of the year, though the demand will not appear until 1958 or later and thereafter grow steadily.

Coal to the Florida peninsula and to other South Atlantic and Gulf Coast states for power production continued to be the objective of joint study by consumers, railroads and producers. This would mean substantial increases in tonnage fairly quickly. Present odds are that movement will develop.

MONEY ENOUGH—Four bits a ton is probably the minimum figure for coal investment in plant and equipment in 1957. Some put it at 60c a ton or better, and chances also are that it will have to be that much in 1958 if the industry is to move ahead on the mine-construction, cost-cutting and quality-improvement fronts as it should.

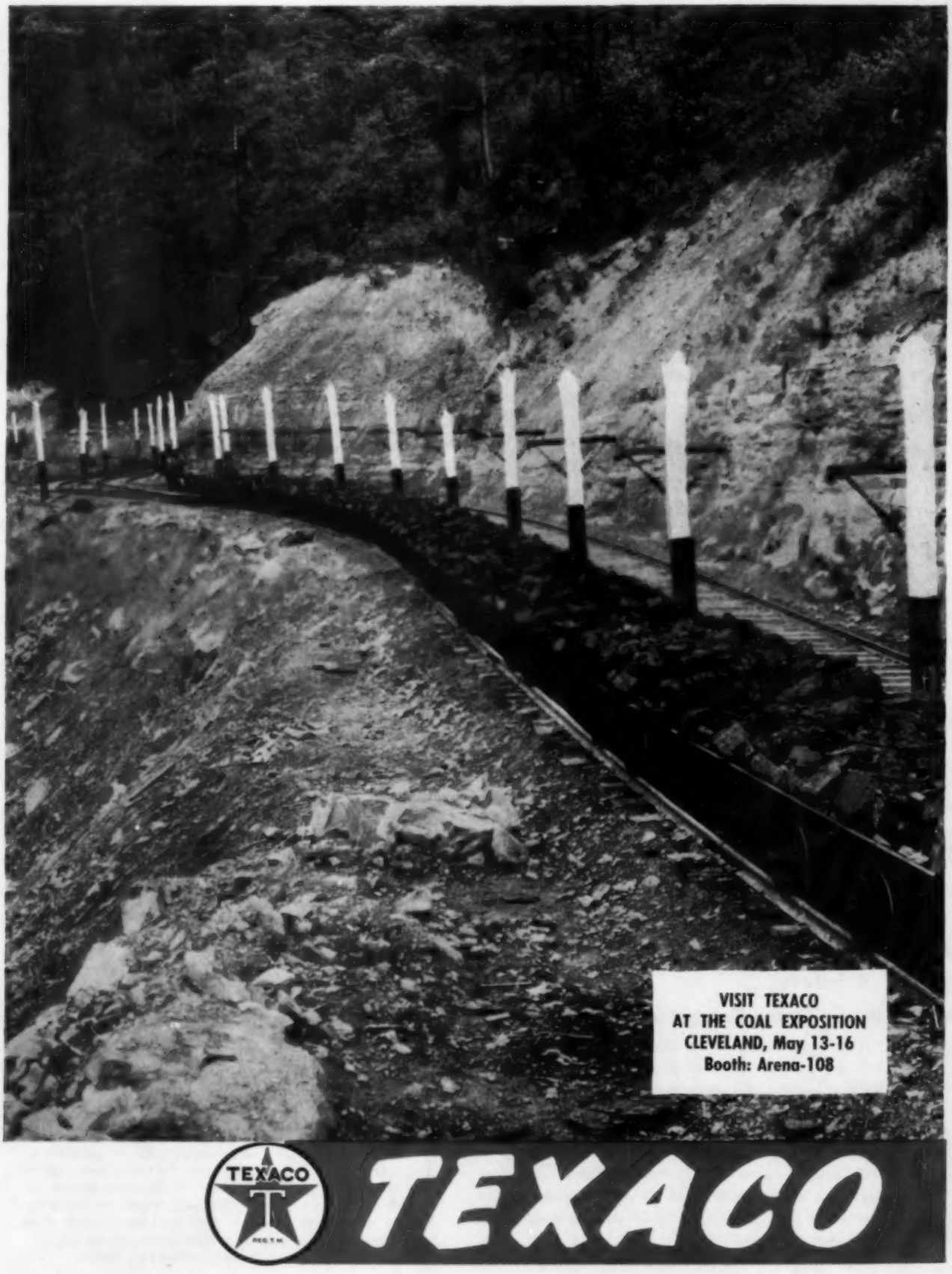
Can coal obtain $300,000,000 or more a year for such expenditures? This is a question being increasingly asked within and without coal circles—perhaps more in fear than expectation of a money shortage. Coal's standing in financial circles right now is probably at an all-time high, and the concern with a possible shortage probably reflects the generally tight money situation rather than deficiencies in coal's appeal.

Coal's present needs are not much greater than its actual expenditures in certain years since 1940. But with money generally tight a little more forethought may be necessary to arrange necessary financing.

COMPETITIVE REPORT—Prospects remain good that coal can continue to retain its recent more-favorable competitive position—and perhaps rack up some new breakthroughs, such as coal over oil for utilities in Florida. The prices of both fuel oil and natural gas are still trending up, with the Atlantic Coast as still the danger spot because of the readiness with which oil imports could be stepped up from already excessive levels. Otherwise, coal can look foward to an improvement in its position—perhaps not rapid but steady.

PRODUCTION REPORT—Look for a higher bituminous output in each of the next three quarters of 1957. This is the word from most of the informed forecasters, including the ommittee on Coal Economics and Statistics of the National Coal Association, which now puts the 1957 total at 516,000,000 tons.

The evidence that this tonnage can be attained—and maybe exceeded—includes the fact that bituminous was making a good comeback in the last weeks of March, with tonnages running well ahead of levels in the corresponding weeks of 1956, and the further fact that business is running at a high level with no significant signs of a dropoff in the foreseeable future.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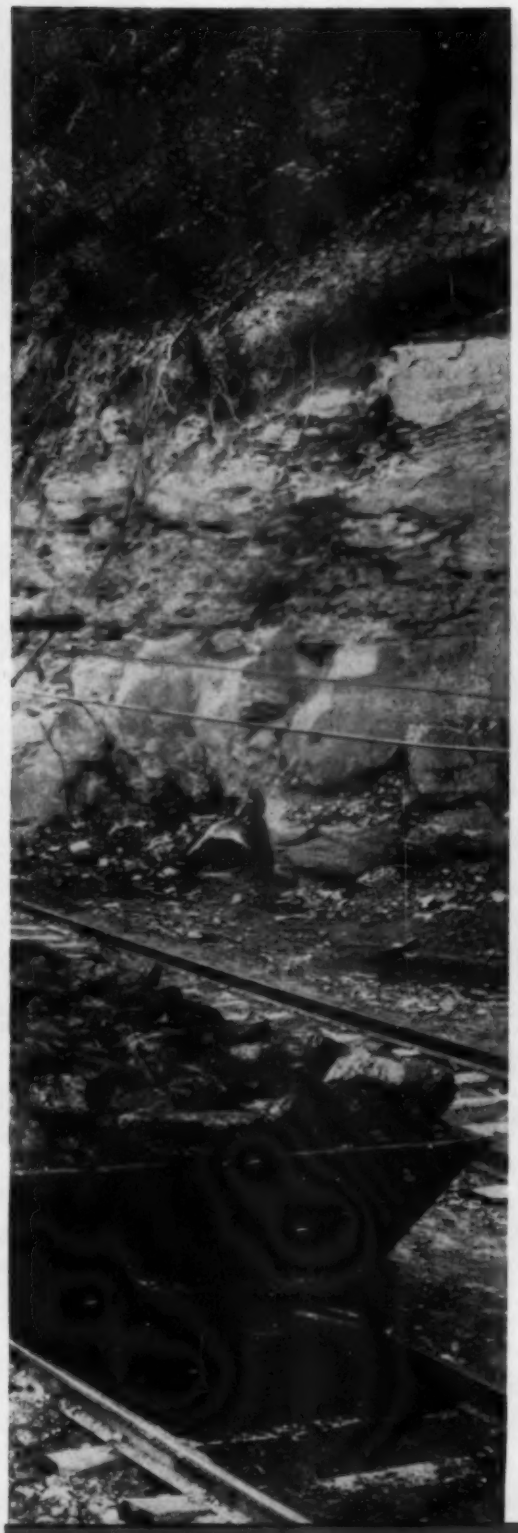

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- **Specially-developed *Olympian* protects mine car bearings, assures longer-than-average life.**
- **As a result, your cars keep rolling smoothly—give you more use because they're always ready to roll.**

SAVINGS add up fast when you lubricate mine car wheel bearings regularly with *Texaco Olympian Grease*. This fine lubricant assures quick, easy starts every time—resists stiffening at winter temperatures. Furthermore, it stays in the bearings under all conditions—gives longer-lasting protection against dirt, moisture and wear.

Texaco Olympian Grease also resists oxidation effectively, will not separate in service or storage. It is available in three consistencies to fill every plain, cavity hub or anti-friction bearing requirement.

Use *Texaco Multifak* for all high-speed, grease-lubricated anti-friction and sleeve bearings in locomotives, motors, cutters and other equipment. This multi-purpose grease is highly resistant to oxidation and water and is exceptionally stable. It gives you maintenance savings, too!

A Texaco Lubrication Engineer can help you set up an efficient, simplified program for your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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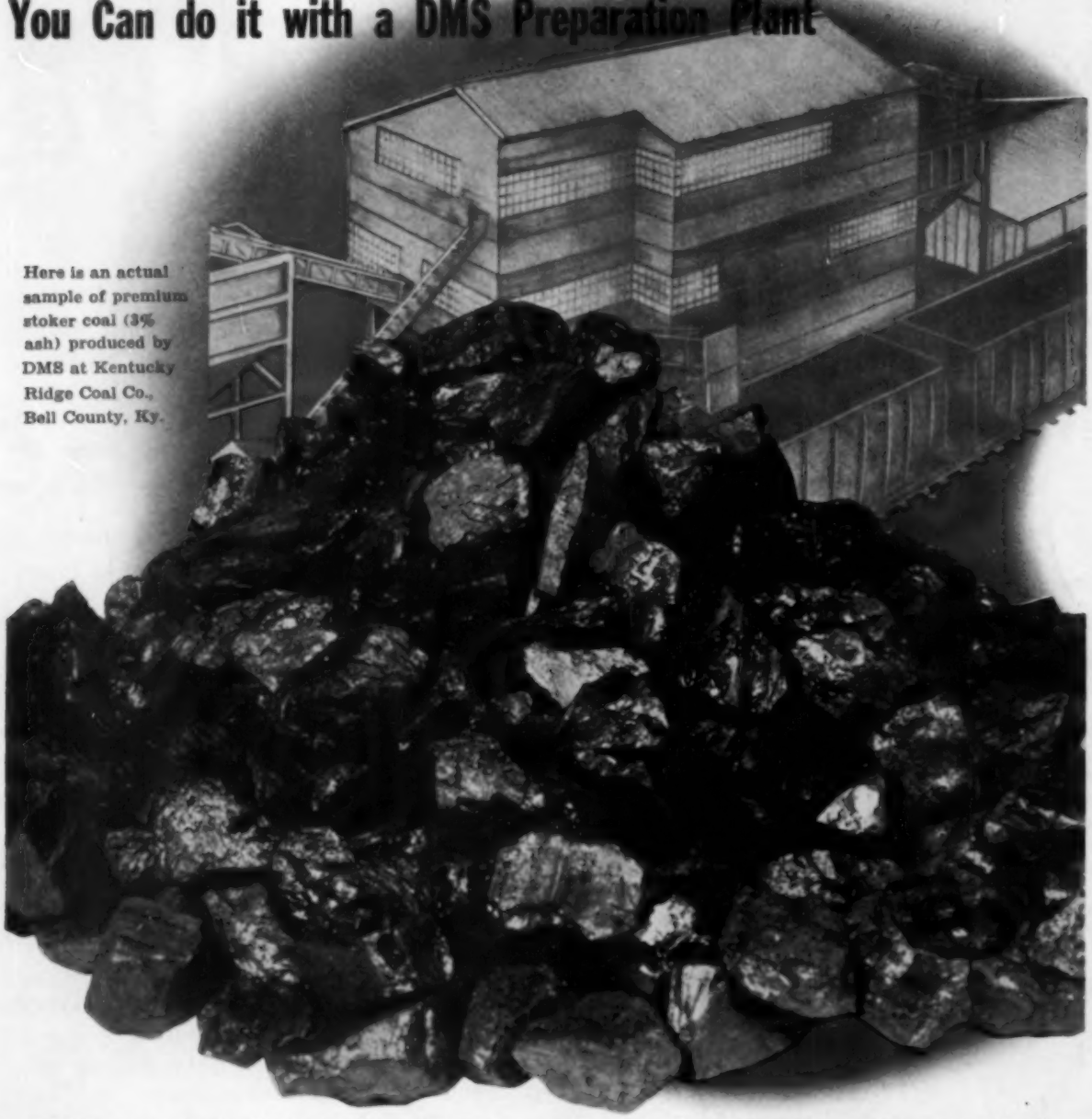

Here is an actual sample of premium stoker coal (3% ash) produced by DMS at Kentucky Ridge Coal Co., Bell County, Ky.

Profits are up at the Crockett Mine of Kentucky Ridge. The DMS Plant has doubled premium stoker coal tonnage. One more performance report that explains why more than 50 producers have installed DMS in less than 3 years.

The only Preparation System that can handle big tonnages and still operate at better than 99% efficiency—DMS means bigger tonnages, lower preparation costs, very low reject ratios and more profits.

Ask about arrangements to inspect the DMS Plant nearest you.

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*REG. U. S. PAT. OFF. No. 623396

This Month in Coal Age

CONTINUED

► New Coal Horizons

Preview, 1957 Coal Show, American Mining Congress, Cleveland, May 13-16 ..... p 99

The Coal Show Program—Nine sessions covering continuous mining, conventional mining, strip mining, coal preparation, management and safety.

The Coal Show Exhibits—A complete listing of products and services scheduled for showing at Cleveland.

New Products at the Coal Show—A special section providing descriptions and illustrations of the bulk of the new materials and equipment to be exhibited at the 1957 American Mining Congress Coal Show.

The Coal Commentator ..... p 12

Continuous miners for thin coal, the Bituminous Coal Institute field engineering program, Russian hydraulic mining, the Weston Dodson Centennial, handling methane in continuous mining.

Editorials ..... p 69

American Mining Coal Show opportunities; trained mining manpower; comments on coal reserves east of the Mississippi.

The Foreman's Forum ..... p 132

Haulage accidents in 1956; how to make suggestions to employees.

Operating Ideas ..... p 140

Handy units ready for fire-fighting; old tire prevents damage to dipper door; low-cost bin made from scrap railroad car; lights prevent condensation in electrical controls; scoop and chute permit easy belt sampling; spring maintenance tips for cooling systems.

Equipment News ..... p 146

Samplings from the regular monthly digest of new products offered by manufacturers include multiple-feed oilers, single-reduction shaft-mounted speed reducers; radio communication equipment; extra-high safety boots, rubber-tired steam machinery cleaner for maintenance, silicone-insulated motors, vibrating screen and off-highway trailer.

News Roundup ..... p 186

Rio Grande R.R. irradiates coal with atomic waste, adds oil, burns mixture as diesel fuel. Overseas, the Russians expand hydraulic mining and the Germans design a spiraling belt conveyor.

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The Coal Commentator

New Lows

The year 1957 eventually may be pegged as the one in which the full mechanical extraction of coal under 36 to 30 in got its start. Part of the evidence supporting this view is the number of low-type continuous miners scheduled for the Cleveland Coal Show of the American Mining Congress (see p. 99 for preview). The list includes mobile units as low as 26 in and a new auger-type machine developed by one of the leading builders of surface augers. Meanwhile the capacity and reliability of the machines for thicker seams are being built up, with corresponding effect on total output and tons per man.

The new thin-coal machines will be especially welcome to expand the list of available units, hitherto restricted almost completely to the planer, slicer and original auger miner. **They are added assurance not only that the operators of thin seams can stay in the picture but that the cost advantages they provide will hold down the industry average and thus help to maintain coal's competitive advantage.**

Good Thirteen

Thirteen can be good in spite of its reputation. A case in point is the announcement of the 13th district established under the field-engineering staff program of Bituminous Coal Institute—"Dedicated to the Better Utilization of Coal." Headquarters are in Buffalo, N. Y., and the field representative is R. C. Flegal, a Penn State fuel-technology graduate. Like other district representatives, his sole responsibility is to provide accurate information on fuels, their cost and the most effective methods for utilizing coal for steam and heat.

The program was set up in the fall of 1956. The new district was created from parts of two other districts and, as BCI points out, "is a direct result of an increasing swing to coal as a fuel for public and private construction. Because of the quick and growing response to BCI's offer of engineering assistance to builders, architects, and anyone else in need of such help, the formation of a new district in the northeast part of the country was required."

District 13 provides further evidence of the importance of engineering service in coal merchandising. Each needs and benefits from the other, and both return benefits in direct relation to the support they receive.

Russian First?

Polysayevskaya Northern is an experimental drift mine set up by the Russians to study the possibilities of hydraulic mining. The coal is first loosened by pulsed-infusion shooting (see *Coal Age*, February, 1957, p 86), after which it is moved off the face by water jets at pressures of 500 psi or higher supplied by nozzles ranging from approximately ⅝ to 1⅛ in in size. It then flows through open steel flumes (pitch is approximately 6 deg) to a crusher which reduces everything to a top size of around 2½ in. The crushed product then is pumped to the preparation plant.

"Simple and impressive" is the way British specialists described this hydraulic mining in Part I of their recent report on "The Coal Industry of the USSR," published by the National Coal Board. They noted that more jobs were planned.

Maybe Russia will wind up in the pages of history as the originator of a new mining technique. It would be something to offset in part the crimes of the Communist Party.

1857-1957

March marked the 100th anniversary of the founding of Weston Dodson & Co., Inc., of Bethlehem, Pa. Weston Dodson, the great uncle of the present head of the firm, John E. Dodson, went into business as a coal wholesaler in 1857, working from a small frame office alongside the Lehigh Canal, at Freemansburg, Pa., 3 mi from Bethlehem. He moved to Bethlehem in 1859 and with first one and then both of his two brothers organized Weston Dodson & Brothers and Weston Dodson & Co., the latter in 1871. The year 1871 marked the organization's first anthracite mining venture. Today it markets nine brands of anthracite and 13 brands of bituminous, and is still expanding.

"Coal shipped in the history of our company," President John E. Dodson notes, "now totals over 100,000,000 tons, and as we enter our second centennial we do so with the conviction of carrying on the code adopted by our founder 100 yr ago: " 'A guarantee and pledge to the coal-consuming public to maintain the highest standards of preparation and quality at all times.' "

The Dodson record makes it easy to offer a sincere salute and all good wishes for the second hundred years.

Surge Handling

Along with lower-cost coal, continuous mining has brought some safety headaches. Increased dust production is one. A higher rate of methane emission is another. In fact, spot concentrations of methane well above the explosive limit have been recorded on a number of occasions, pointing up the seriousness of the problem.

Positive and reliable ventilation is the major defense, but is there anything more that can or should be done? Since, in addition to the steady rate that must be provided for, surges must be expected and offer the biggest hazard. They are one item worthy of major attention. The steps that might be taken to guard against surges include a continuous methane indicator and alarm at the face, perhaps interlocked into the power supply to stop the machine when explosive concentrations are encountered. These and other possible methods of offsetting increased methane emission merit major attention.

A new line of Standard Oil greases

IN COAL-HANDLING SYSTEMS

LONGER SERVICE-LESS MAINTENANCE

where USS "T-1" Steel is being used!

Listen to coal rumble, scour, and scrape down a chute . . . bang into a hopper. Imagine the impact and abrasion generated by ton after ton after ton of it. You'll realize why it takes an extraordinary steel to give long service without repair in coal-handling equipment. And you'll realize why USS "T-1" Steel is becoming standard for such service.

For maximum resistance to impact abrasion, USS "T-1" Steel is furnished hardened to 321 minimum Brinell. In this condition, it assures the durability to minimize maintenance and repair costs. And it often permits use of thinner gages to save weight, material, and to cut the cost of supporting structures and foundations.

And here's the clincher. USS "T-1" Steel can be welded in the field without pre- or post-heating. This is unique in a steel so strong and durable. It means on-the-spot fabrication at minimum cost.

Also remember "T-1's" remarkable toughness, even at sub-zero temperatures. Outdoors and indoors, "T-1" assures long life, minimum repair.

In electric power plants . . . in coal preparation plants . . . in strip and underground mines, USS "T-1" Steel not only can cut your costs but also can improve the performance of your coal-handling systems. It's service-tested. Write, wire or phone our nearest District Sales Office for complete information.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION • WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

"USS" and "T-1" are registered trademarks.

Watch the **United States Steel Hour** on TV every other Wednesday (10 p.m. Eastern time).

UNITED STATES STEEL

A new line of Standard Oil greases

RYKON

GREASE

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a unique new non-soap, organic thickening agent.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce the maintenance and grease handling problems encountered in industry.

RYKON Grease properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability—Better heat stability than any other petroleum oil grease. ASTM dropping point of 480°F. Maintain consistency in service at high temperatures.

Mechanically stable—Maintain consistency even under severe mechanical working in service.

Chemically stable—Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Wide temperature range—Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance—Do not lose consistency in presence of water. Highly resistant to water washout.

Oil separation—Minimum bleeding of oil in service and storage.

Anti-rusting—Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong type of grease or the use of an "economy" grease lubricant.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Check Chart Of RYKON Greases

Regular Line	Grade Consistency
RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E. P.	0
RYKON Grease No. 1 E. P.	1
RYKON Grease No. 2 E. P.	2

STANDARD

STANDARD OIL COMPANY (Indiana)

FLETCHER DUAL DRILLS with Automatic Feed Control

LATCH DOWN the feed and rotation levers on this Fletcher Model DJ drill — *turn your back on it* — and it will drill a full-depth hole through roof that varies from soft shale to hard sandstone *faster and more efficiently than the best-trained drill operator.* Speed drops and thrust increases when it hits sandstone — instantly — before the bit can be dulled — and thrust drops while rotation and penetration rate increase as softer material is entered.

Fletcher
ROOF CONTROL DRILLS

The Results?

- **More bolts installed per shift!**
- **More footage per bit — so lower bit cost!**
- **Every operator gets top results because no experience or "feel" is required!**

Check with your Fletcher field man on the Model DJ — or any of the many other Fletcher designs. You'll quickly discover *why more Fletcher Drills are in service than all other rotary drills combined!*

J. H. FLETCHER & CO. | P. O. Box 353, HUNTINGTON 8, WEST VIRGINIA
Phone 44186

Here's news for the knot hole gang!

No reason to peek and wonder any longer—

Lee-Norse NEW LOW COAL MINER
(LCM—26)

will be on DISPLAY in Booth No. 115-119 at the AMERICAN MINING CONGRESS in CLEVELAND—May 13-16! SEE IT!

SEE, too, the well-known and already widely used Lee-Norse Miner and the popular Mine Portal Bus!

Lee-Norse Company
CHARLEROI, PA.
"SPECIALISTS IN COAL MINING EQUIPMENT"

No hydraulics to break, leak or freeze-up!
No small front steer-wheels to align!
No tie-rods to bend!
No long drive-shaft to maintain!
No frame to warp!
No springs to break!

Cuts your hauling costs!

Tournapull Rear-Dump overcomes most maintenance problems of conventional haulers

Construction of Tournapull Rear-Dump is radically different (and much simpler) than that of a conventional heavy-duty hauler. In place of a foundation frame and body sub-frame, Tournapull Rear-Dump hitches rear and front wheels through a horizontal yoke extending back from the kingpin, and pivoted to body itself just above and ahead of rear wheels. Body is simpler, much stronger . . . has no frame and sub-frame to get out of line.

Look at the photo above . . . note the absence of springs, spring hangers, and tie rods. Low-pressure tires adequately absorb the shocks of rough haul-road travel and shovel loading. Eliminated are spring maintenance, replacement time, and cost of spring parts.

Front-wheel drive and kingpin-type power steer helps simplify Tournapull construction, too. No longer must power be carried back to the rear through a drive-shaft. Bearing and lubricating problems of a long drive-shaft are eliminated. No longer is steering handled by small front wheels subject to "bulldozing" and misalignment. There are no tie rods, no hinged steering connections to become twisted or bent.

Nor do you have the troubles of hydraulic hoists or gravity dumping with these Rear-Dumps. Dump is by an electric winch, that lifts the body up on twin cables. Operation is under complete control at all times — with positive power for dump and return controlled by an electric switch on the dash. There are no oil seals, hydraulic pumps . . . no high-pressure lines and jacks to keep tight . . . no freezing up in cold weather as with hydraulics. There are no shock loads as in gravity dumping. You save on regular maintenance time because there is no hoist mechanism to check . . . only a few places to inspect and lubricate.

Let us show you how these savings can put money in *your* pocket. For proof, we'll be glad to show you performance figures from a job like yours. Or, if you wish, we'll give you names and addresses of nearby owners of Tournapull Rear-Dumps, so you can check the facts for yourself.

Model D — 11 tons, 138 hp

Model C — 22 tons, 208 hp

Model B — 35 tons, 293 hp

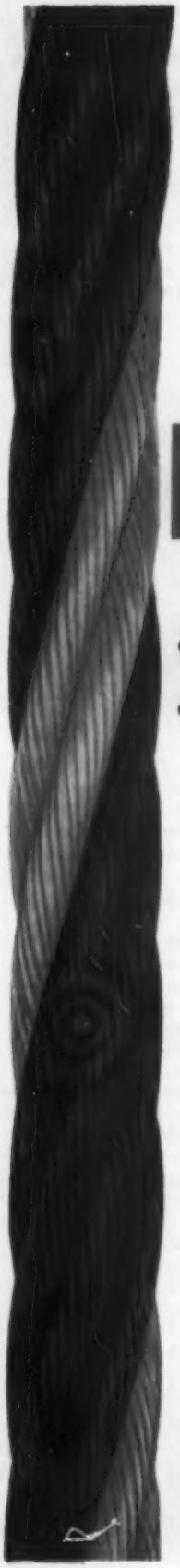
Now available with optional tailgate. Prime-mover also powers interchangeable scraper, bottom-dump, flat-bed, crane, logging arch.

Tournapull—Trademark Reg. U.S. Pat. Off. R-1171-G-B

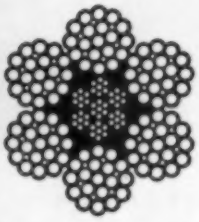
LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT



WICKWIRE
DOUBLE GRAY
WIRE ROPE



An extra improved plow steel wire rope with independent wire rope core, Double Gray gives you a rated breaking strength that's 15% greater than the catalog breaking strength of ropes of the same size and type made from improved plow steel.

Double Gray is *not* a new rope . . . *not* a rope that's offered to you on an "experimental" basis. Instead, it's been thoroughly tested in both the field and the laboratory. This means that you can now get extra high strength ropes with greater abrasion and crushing resistance . . . *plus* the knowledge that you're using a *safe* wire rope that's made by a company long known for its top-quality products.

Contact your nearby Wickwire Distributor or CF&I sales office for complete details and recommendations for your particular applications.

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

WICKWIRE ROPE — A CF&I PRODUCT

THE COLORADO FUEL AND IRON CORPORATION—Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.)
New Orleans • New York • Philadelphia

LOOK FOR THE YELLOW TRIANGLE

5078

At Oro Grande, California

▲ Oversize pieces of limestone are readily pulled out of the blasted material and segregated for breaking.

▲ One of Tournatractor's jobs is moving equipment. Machine easily and quickly tows this heavy drill from one blast site to the next.

One fast rubber-tired tractor takes over all pit clean-up . . . speeds production

In Riverside Cement Company's limestone quarry at Oro Grande, California, there are many scattered jobs that must be done quickly, without interference to production. These jobs include clean-up around quarry shovels, leveling waste dumps, dozing overburden, towing other equipment around the quarry.

To do this variety of jobs at its Oro Grande property, Riverside Cement Company, of Los Angeles, first tried a 150 hp, 5.8 mph crawler tractor. They found the machine too slow. It couldn't get around fast enough to do its varied assignments.

More work done in less time

Recently Riverside Cement Company purchased and placed in service a 17 mph, 210 hp, rubber-tired Tournatractor. With the increased speed and flexibility of this unit, Riverside finds that critical jobs can now be completed in less time than before; eliminating production delays, cutting costs.

Big rubber tires "cushion" shock

Working on rocky quarry floor, the big, low-pressure Tournatractor tires absorb shock, ride smoothly over rough going, with minimum "wear-and-tear" to operator and machine. And Tournatractor's power-train is sealed against quarry dust and gritty materials. Lubricants are kept clean and free from abrasives, damage and wear to bearings and moving parts is prevented, maintenance time and expense is reduced.

Investigate Tournatractors

For fast, all-around mine and quarry duty, investigate the highly maneuverable Tournatractor. Let us send you some owner-verified reports on Tournatractor performance. Write for full details.

▲ Tournatractor's 17 mph speed handles shovel clean-up in a hurry . . . cuts work delays . . . increases daily output. Rubber-tired tractor "outruns" crawler 2-to-1.

▲ Air compressors, and other mine equipment, moved fast from one job location to another. Tournatractor gets *more work done, fast, at low operating cost.*

Tournatractor—Trademark Reg. U.S. Pat. Off. T-872-M-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

NOW... faster, easier going in any height seam...

COLMOL®

Continuous Mining Machines

JEFFREY NOW OFFERS a full range of heights in time-saving, cost-saving continuous mining machines. You can have all the advantages of continuous mining in seams as low as 28" with the new 86A Colmol . . . . make cuts up to 96" high with the 76CM Colmol. And there is a complete range of in-between sizes.

The new 86A Colmol makes a cut 28" high and 14'7" wide, gives good cleanup and smooth bottoming. A newly designed gathering chain cuts the bottom 8" of coal and leaves no valleys. Coal is carried to the center of the Colmol, then up the center onto the swinging discharge conveyor.

With a Colmol, coal is broken from the face, not ripped or ground off. You get more favorable overall screen consist, as well as extra speed and efficiency.

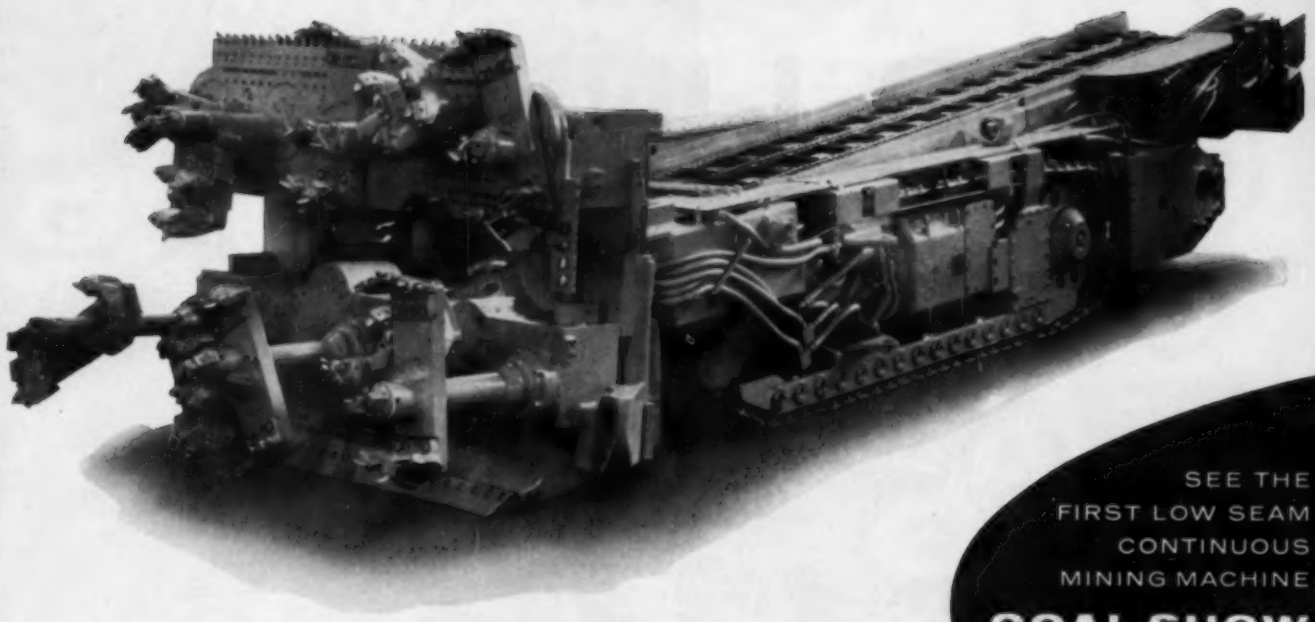
The Colmol is a powerful, rugged, compact machine. It is capable of withstanding the most severe operating conditions...operates with little noise and practically no vibration. All adjustments are hydraulic and can be made instantly and accurately. Once the controls have been set, they need almost no attention. Operator fatigue is greatly reduced with the smooth-going Colmol.

Readily accessible operating parts make adjustments and servicing easy . . . keep downtime to a minimum. And the Colmol is equipped with safety features to protect both personnel and the machine.

Molveyor trails the Colmol, sends output back in an uninterrupted stream. Trams under full load, forms flexible link between Colmol and belt line.

Loaders have power for the toughest jobs. Discharge conveyor swings 45° to either side of center and elevates to proper height for most efficient loading. Easy to maneuver.

Belt Conveyors for all purposes are available in the complete Jeffrey line. You can choose the exact head section and frame for every coal moving task.

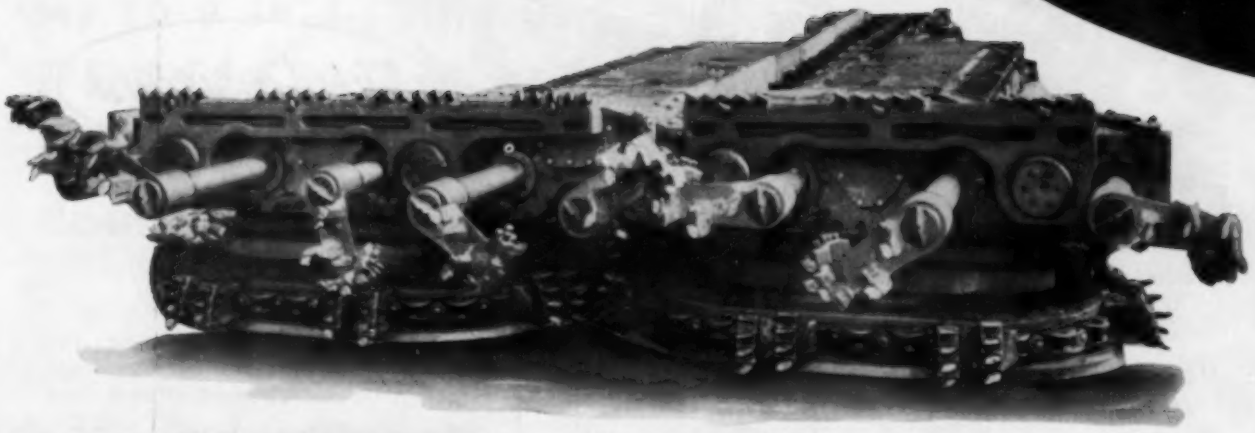


UP TO 96" HIGH

SEE THE
FIRST LOW SEAM
CONTINUOUS
MINING MACHINE

COAL SHOW

MAY 13 – 16
CLEVELAND



AND NOW...86A COLMOL
Only 25" high — 14' 7" wide

Jeffrey Shuttle Cars haul big payloads. They're built for rugged service and easy maneuvering. Variable speed loading and unloading make them highly efficient.

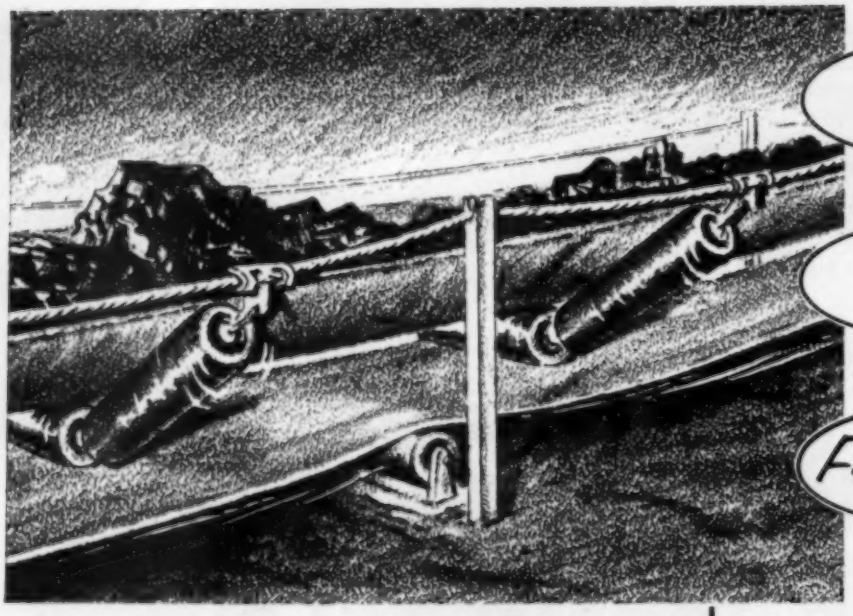
THE JEFFREY MANUFACTURING COMPANY • COLUMBUS 16, OHIO

JEFFREY

MINING • CONVEYING • PROCESSING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

GOLD LINE SCANDURA

FOR COAL MINING



Tough

Strong

Fire Resistant

Acceptance designation "Fire-Resistant, U.S.B.M. No. 28-1" has been assigned to this belt.

More and more mines are using and reordering SCANDURA because:

GOLD LINE is completely Fire-Resistant

GOLD LINE uses mildew inhibitors and rot proof Nylon to assure *double* mildew and moisture protection

GOLD LINE resists abrasion and cover stripping better than conventional belting

GOLD LINE easily absorbs shock loads and impacts

GOLD LINE has a tensile strength substantially higher than conventional five ply belts.

"THE BEST OF THEM ALL"

Exclusive Distributors for the Mining Industry East of the Mississippi

National Mine Service Company

Suite 564, Alcoa Building, Pittsburgh 19, Pa.

All-State Div., Logan W. Va. • Whiteman Div., Indiana, Pa.
Morgantown Div., Morgantown, W. Va. • Ky.-Va. Div., Jenkins, Ky.
Western Ky. Div., Madisonville, Ky. • Ashland Div., Ashland, Ky.
Anthracite Div., Forty Fort, Pa. • Bemeco Div., Beckeley, W. Va.

SCANDINAVIA BELTING COMPANY

Newark 1, N. J. PLANT: Charlotte, N. C.

Makes More Money. Bryan Keith's versatile Skid-Shovel earns profits on other operations as well as the coal-stripping work, shown. It handles conservation jobs, land clearing, and basement digging. Mr. Keith says, "On basements, I can cut straighter walls ... back out of the hole with a full load where other loaders could only come out forward and half-loaded."

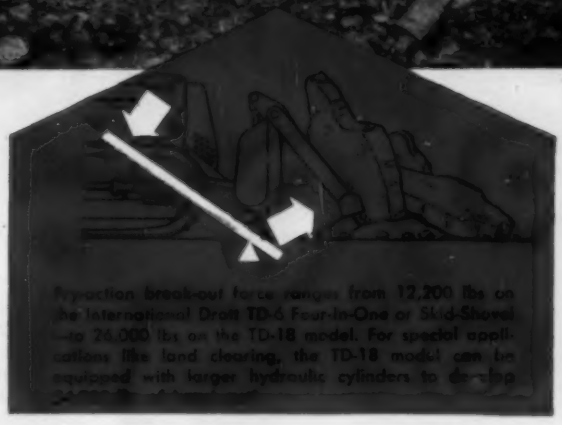
"My TD-9 Skid-Shovel's PRY-ACTION BREAK-OUT doubles production"

—Bryan Keith, Manchester, Kentucky

"The pry-action break-out of my TD-9 Skid-Shovel practically doubles production over other equal-sized crawler loaders."

That's Bryan Keith, Manchester, Ky., reporting on the work power of his International Drott TD-9 Skid-Shovel.

Clearing brush, stripping 14 feet of 30% rock overburden and loading out coal—that's typical of the TD-9 Skid-Shovel's work schedule on which he bases his remarks. His TD-9 Skid-Shovel strips 50 cu yd of overburden per hour. It loads unshot coal direct from the seam.



Pry-action break-out force ranges from 12,200 lbs on the International Drott TD-6 Four-In-One or Skid-Shovel —to 26,000 lbs on the TD-18 model. For special applications like land clearing, the TD-18 model can be equipped with larger hydraulic cylinders to develop

What about dependability and long life?

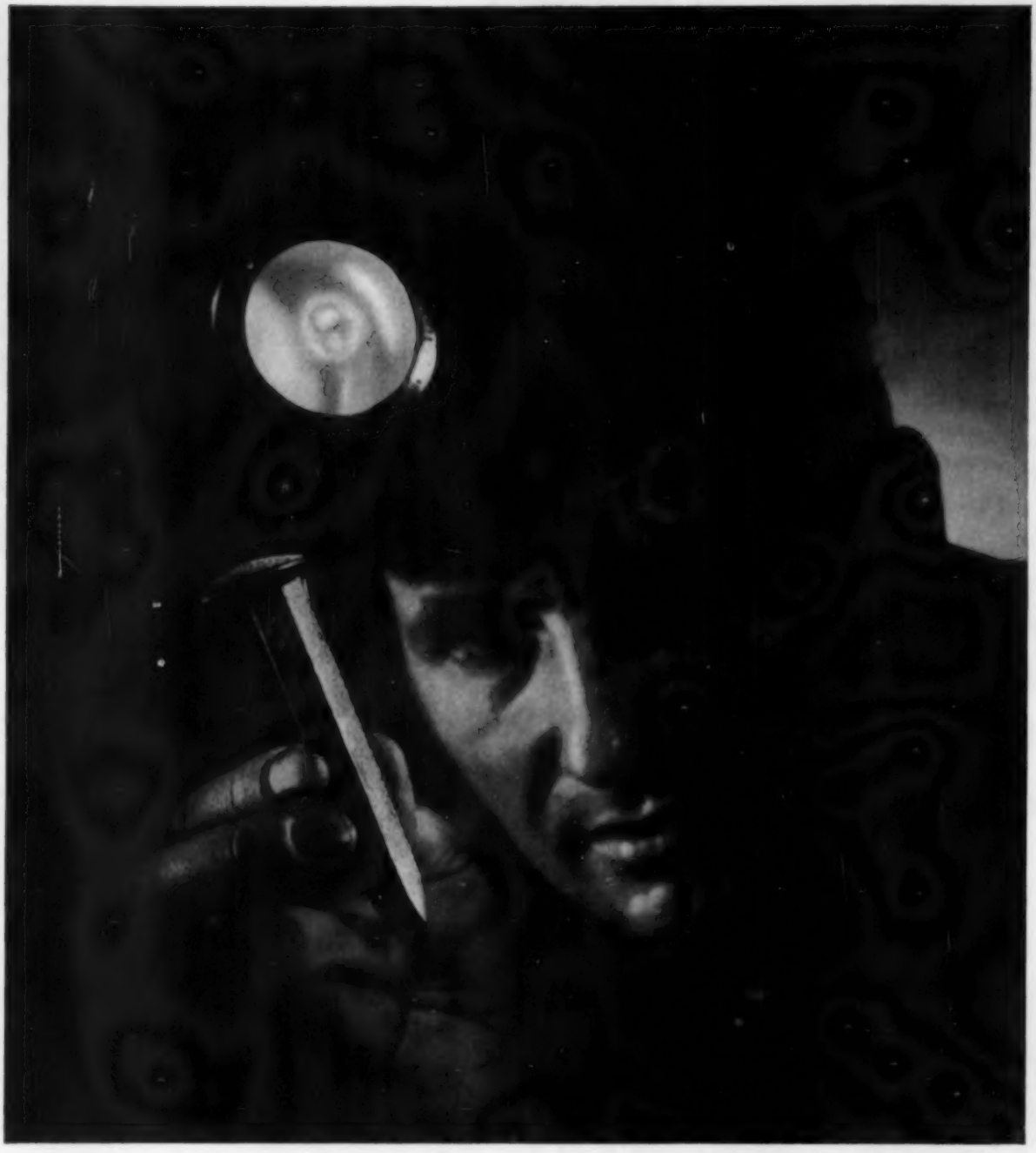
"The exclusive skid-shoes, and Hydro-Spring design save wear on the crawler, insure comfort and safety for the operator," says Mr. Keith. "Operation is economical and the outfit is easy to maintain."

See how an International Drott Skid-Shovel does jobs other rigs can't do—with triple-power pry-action break-out teamed with bucket-heaping, ground-level roll-back. Compare how exclusive shock-swallowing Hydro-Spring protects equipment and operator. Ask your International Construction Equipment Distributor for a Four-In-One or Skid-Shovel demonstration.

Here's Mr. Keith's TD-9 Skid-Shovel semi-skidding a load of "spoil" upgrade—making use of the exclusive big skid-shoes.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®



"I've driven Bethlehem Spikes by the hundreds.
With such strong heads and sharp points,
no wonder they drive so true!"

Track bolts and machine bolts, too!

BETHLEHEM STEEL

New Equipment

McCarthy Model No. 14-30-36 Coal Recovery Drill

McCARTHY AUGER DRILL BORES COAL FOR $2 PER TON

including make-ready, operation, maintenance, depreciation and hauling

Auger-mine low-cost recovery coal.

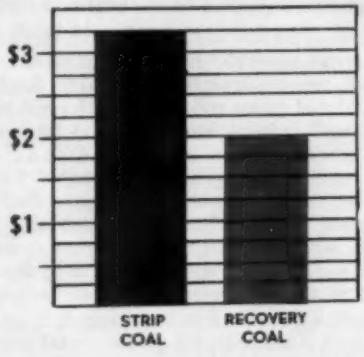
One Southern Ohio strip mine operator produced approximately 10,000 tons of recovery coal per month with only one McCarthy Model 14-30-36 Coal Recovery Drill, working *one six-hour shift per day* with only two operators. The cost per ton, including make-ready, operation, maintenance, depreciation and hauling, was only $2.

This is why more operators each year add McCarthy Coal Recovery Drills to their list of production equipment. The McCarthy drill is a cost-saver and a money-maker. It's self-moving, all hydraulic, and requires only two operators. Contact the nearest Salem Tool representative for details. For immediate service, phone or write direct.

For more information ask for Bulletins M-101 and 102. Visit our Booth #2141 at the Coal Show.

It Pays to Auger-Mine Low-Cost Recovery Coal

MINING COST PER TON*



*Based on 10,000 tons of augered coal per month.

Manufacturer of Drilling Equipment Since 1901

THE SALEM TOOL CO.

SALEM

763 S. ELLSWORTH AVE. • SALEM, OHIO U. S. A.

for New Horizons in Coal

New Equipment

21782

Goodman Continuous Borer

This rugged, powerful machine has all the capacity, power and maneuverability for entry development, room work, and pillar recovery. With an 8-man crew, including roof bolters, mechanic and foreman it has produced a tons-per-man average as high as 155.3. For a full six-months period it has averaged 724.97 tons per shift with a tons-per-man average of 90.62. At still another mine it consistently produced an average of 861.3 tons per shift, or 123 tons per man, and at the same time reduced face cost per ton to ½ that for conventional mining. This reduced cost included labor and maintenance as well as materials such as roof bolt supplies, rock dust, bits, oil, grease—and after mining over 500,000 tons of coal in steady service the machine has not yet been scheduled for a major overhaul.

The Goodman Continuous Borer is the most consistent high tonnage producing machine on the market today and at every installation has raised the working face efficiency level. It promotes true concentrated working areas requiring fewer man-hours and less supervision. It eliminates hazards associated with drilling and blasting, by cutting an arched path for natural roof support, by advancing rapidly so that rooms are kept open but a short time thus reducing possibilities of roof deterioration. Maintenance cost is low because of simple design featuring large parts and a minimum of moving parts.

The Goodman Borer is an investment that can be written off in terms of greater productivity and lower cost per ton in a surprisingly short period of time.

Goodman Extensible Conveyor—ROPEX®

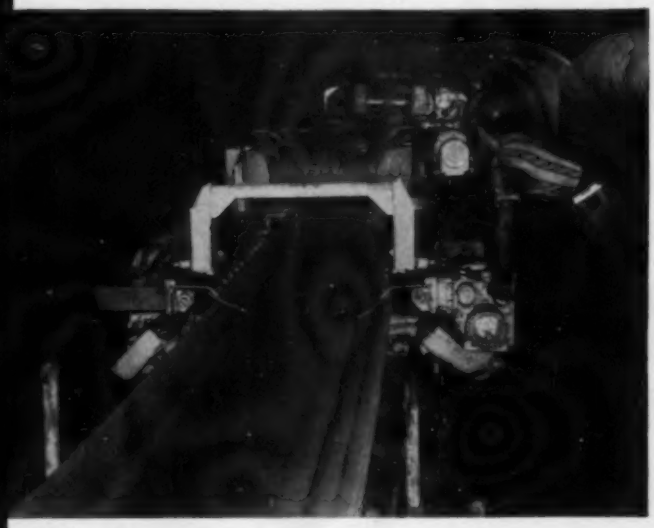
Here's a 36" width belt conveyor that increases or shortens its own length, under its own power, while running coal. Linked to any continuous miner or loader it keeps pace with the face. It eliminates delays and interruptions providing a continuous flow of coal to the out-of-the-mine transportation system. It provides for as much as 200 feet of belt storage for 100 feet of advance before adding belt. Along the line Ropex has no heavy structural framing, no rigid idler assemblies. The belt rides on linked idlers suspended between parallel wire ropes anchored to the head

Patents issued or pending on all machinery illustrated

® Registered Trade-mark

for New Horizons in Coal

section and payed off storage drums on the tail section. Coal moves fast, smoothly and evenly from tail to head with no jolts or bumps to cause shifting or spilling. During extension (1,000′ max.) or retraction, loaded or unloaded, predetermined tension on belt and wire ropes is automatically maintained. Motor driven bridge conveyor between tail section and loading equipment swivels to right or left, has 13½′ range of forward and back travel. And here's another advantage of Ropex—the discharge height at head can be adjusted. There's no need of cribbing or support.



21784

Tread mounted tail section of Ropex bridge connected to a Goodman Continuous Borer. It's always in position to accept load and keep it moving.

Open construction of belt storage framework at tread mounted head section of Ropex. Belt is easy to add, can always be inspected.

21787

21556

Goodman Rope Belt Conveyor

The most useful conveyor you can buy—it's practical anywhere in a mine for any type of service. By eliminating almost everything but the belt itself and the terminal units hours have been chopped off installation and extension time. For example, the Rope Belt can be extended 150 feet in less than one hour between shifts, with no loss in production time, and all necessary parts can be hauled in one mine car or shuttle car. As for carrying capacity the Rope Belt can't be beat. Hinged action of the linked idlers and spring action of the wire ropes "cup" the belt to the load, light or heavy, providing shock-free travel without shifting or spillage. The minimizing of shock also means less wear on belt and idlers, fewer repairs, infrequent replacement. And here are some other advantages to consider: cost of intermediate section of Goodman Rope Belt conveyor is as much as 50% less than for conventional type. Cost of belting can be less because lighter ply belt can frequently be used. Clean-up time along the conveyor is negligible.

Cost savings in all respects, coupled with operating advantages have been proved wherever Goodman Rope Belt conveyors have been installed. Why not investigate now?

At the Coal Show **Goodman will be located at their usual area in the lower lakeside hall of Cleveland's Auditorium and welcomes your inspection of modern machines for modern mines.**

To be displayed:

- An entirely new model Continuous Borer for lower measures of coal
- A high model Continuous Borer that is establishing new records almost daily
- The Ropex extensible conveyor
- A section of the famous Rope Belt conveyor
- A rubber tired cutting machine
- The newest addition to the Goodman loader line
- A shuttle car that has yet to be out-performed
- A roof bolting drill that really eliminates dust
- The Wilcox auger type miner for low coal

See and hear why equipment of this type represents an investment, not an expenditure.

GOODMAN

MANUFACTURING COMPANY

Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

Patents issued or pending on all machinery illustrated

® Registered Trade-Mark

New Solid Tire

Ends Downtime!

Can't fail from Ruptures...Cuts...Bruises! Can't fail from Air Loss!

Increases coal output!

Proved beyond doubt by months and months of actual mine operations. Less rolling resistance—permits higher allowed vehicle speeds. Wide, flat tread compacts mine floor, resists rutting, won't bog down.

No delays, no tires fail unexpectedly. All tire changing is done during non-production time, between shifts or off shifts.

Readily adaptable to present equipment. Specify them on new equipment!

Rides softer than pneumatics!
Lifetime cushioning that won't harden with age, means less downtime for shuttle car repairs or adjustments.

Outwears Pneumatics

as much as 3 to 1

Wider tread, more rubber in shoulders . . . new, tougher compound, cut and chip resistant—for longer life . . . no production stoppages for tire replacement.

ROYAL CUSHION

ONLY THIS NEW U. S. ROYAL DELIVERS ALL THESE NEW ADVANTAGES:

1. **NO EMERGENCY DOWNTIME.** No sudden tire failures to cause work delays and lost production.
2. **LESS RUTTING OUT MINE FLOOR.** Wide, flat profile tamps down, levels off surfaces.
3. **GREATER FLOTATION.** New, broader tread keeps shuttle cars from bogging down.
4. **2 to 3 TIMES LONGER WEAR.** Extra rubber in the wider tread means longer life, fewer tire changes, no production stoppages.
5. **HIGHER SPEEDS.** Less rolling resistance . . . more trips . . . more production.
6. **EXTRA CHIP RESISTANCE.** Tread stock is specially compounded to prevent chips, cuts.
7. **50% MORE "RESERVE" CAPACITY.** Could carry half again the load of comparable-size pneumatic. No need to use duals!

See us at Booth #801 at the Coal Show

For details, write Mr. C. E. Drennen, Industrial Tire Department:

United States Rubber

Rockefeller Center, New York 20, N. Y.

In Canada: Dominion Rubber Co., Ltd.

TD-24 "doubles" for

ON OHIO BENCHING

Besides drastically reducing machinery and labor costs anticipated on this operation, the TD-24 is beating tough conditions that stopped other big crawler power "in its tracks"!

Here's B & P Coal Company's TD-24 'dozing dirt and rock over edge of bench. Instant Planet Power steering gives positive control of either track for sure, full-power turning with the load!

'dozer-shovel team

OPERATION

Big savings are resulting from big overburden removing capacity of an International TD-24 Torque-Converter crawler—for B & P Coal Company, Cadiz, Ohio.

"Our TD-24 is doing a job we originally thought should be handled by a large shovel and dozer team," reports the coal company's superintendent, David C. Furman. "Our operation is moving well ahead of schedule."

The B & P Company is benching three miles of highwall for high-speed auger mining of a 69-inch coal seam near St. Clairsville, Ohio. Bench width averages 40 feet. The 'dozing push runs from 100 to 125 feet—overburden depth averages 10 feet of tough boulder-strewn dirt, rock-strata, and slate.

With this amount of material to move, the TD-24 had benched 575 lineal feet, ready for highwall mining, in only 64 working hours!

"Dead-track drag" eliminated!

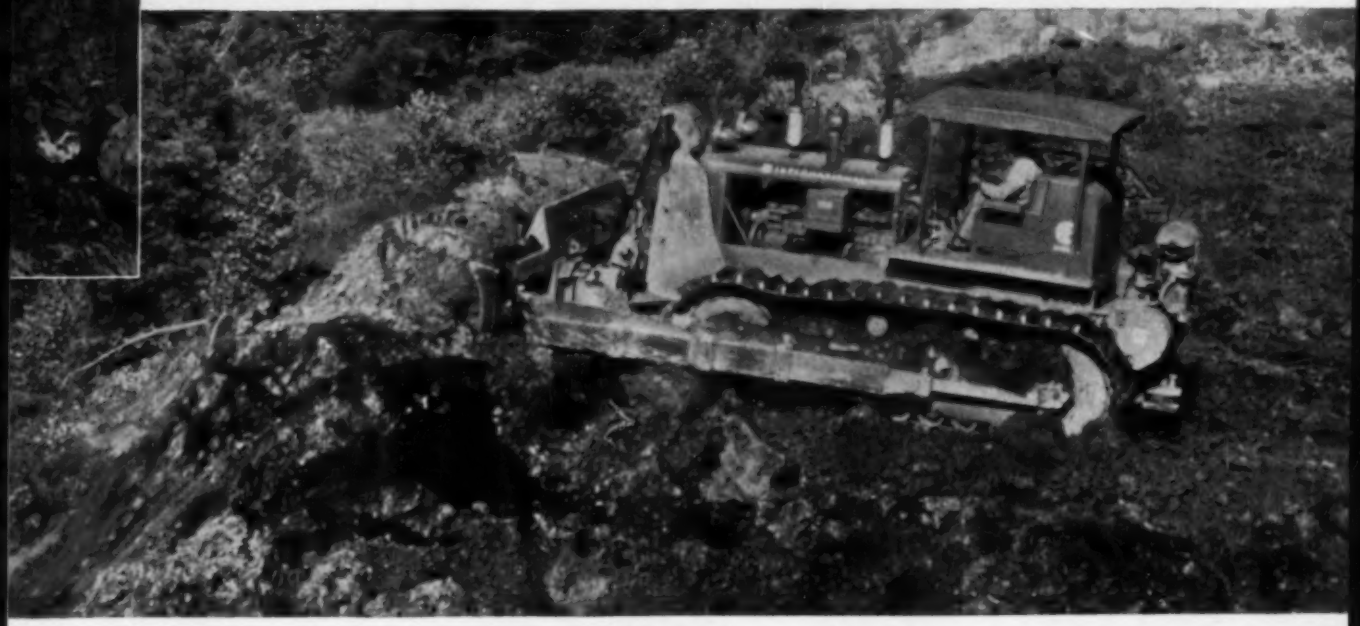
B & P Coal Company's investment-cutting TD-24 work capacity begins with load-lugging International diesel power—teamed with full-power Torque-Converter push. Exclusive Planet Power steering gives the TD-24 full-time live power on both tracks for cycle-speeding turns under load. No more load-limiting dead-track drag on the turns! And in Torque-Converter or Gear Drive models, the TD-24's exclusive two-speed planetary system gives instant, stall-preventing Hi-Lo shifting without "uncoupling" the power!

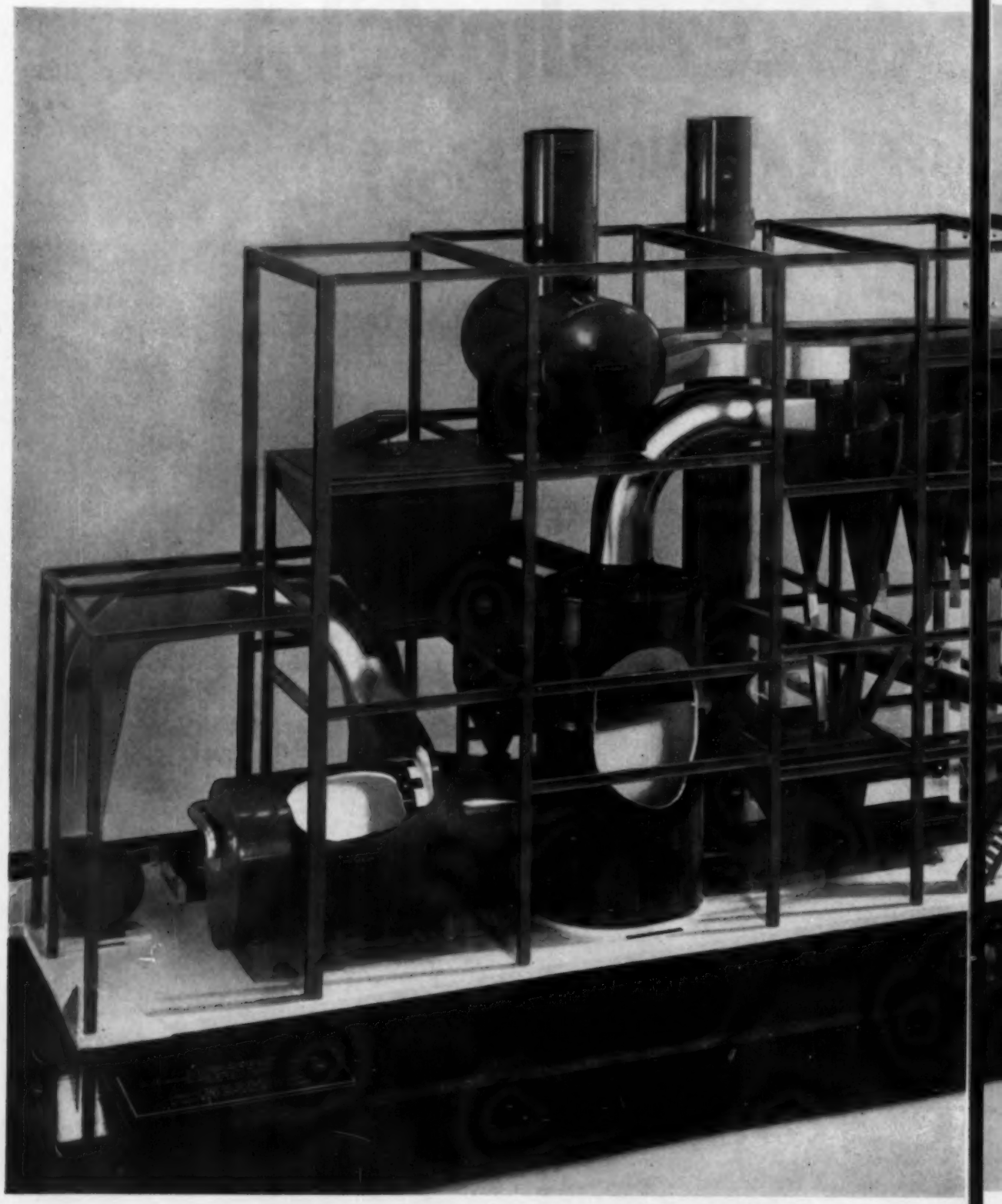
See how giant-sized TD-24 capacity can reduce your equipment investment and increase output per man. Examine TD-24 features like finger-tip ease of control—features that increase operator comfort and performance! See your International Construction Equipment Distributor for a demonstration.

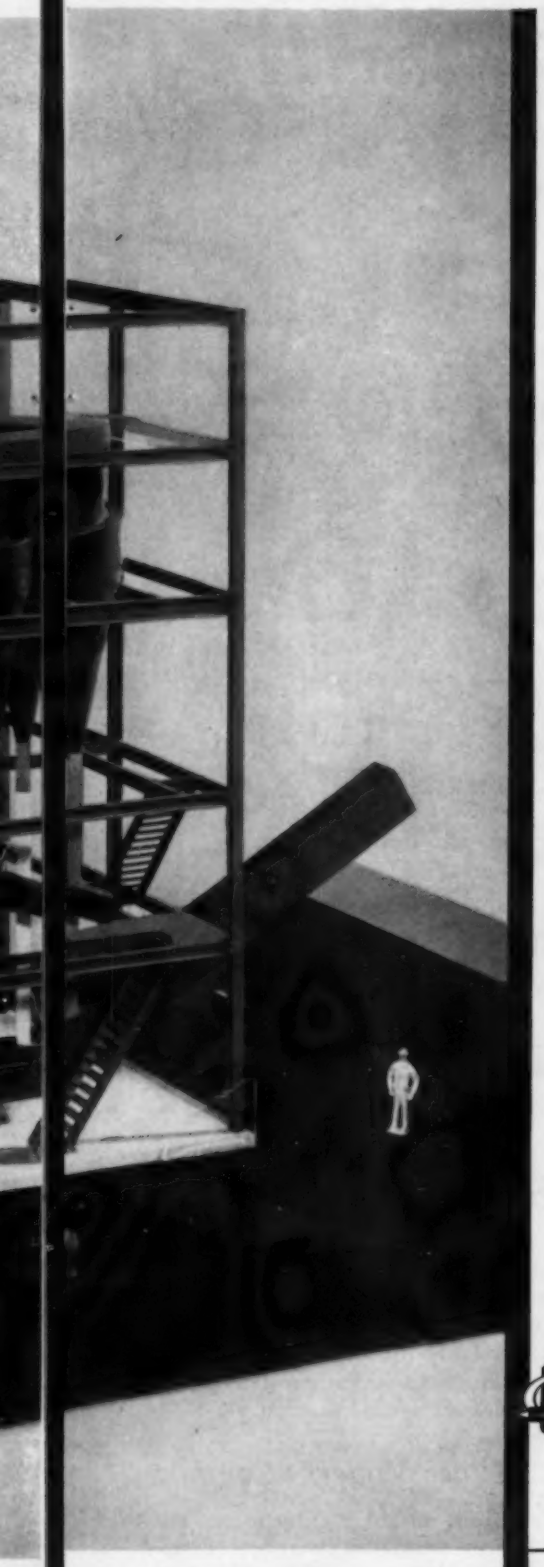
INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.







At Inland Steel Company ANOTHER DORRCO FLUOSOLIDS SYSTEM FOR FINE COAL DRYING

Another large installation of the Dorrco FluoSolids system for coal drying is scheduled for start up in late 1957 at the Inland Steel Company's new coal drying plant at Price, Kentucky.

The system is designed to remove 25 tons per hour of water in a single Reactor from a wet feed of 230 tons per hour of ⅜" x 0 or ⅝" x 0 metallurgical coal.

The first Dorrco FluoSolids coal drying system has been on stream for nearly two years and operating data assembled has conclusively proven that fluidization, as compared with conventional thermal coal drying results in . . .

HIGHER EFFICIENCY — due to instantaneous vaporization of surface moisture. Automatic control of wet coal feed rate to fluid bed accurately maintains preselected bed temperature.

HIGHER CAPACITY — at Inland the entire 230 tph is dried in a single 14′ diameter FluoSolids Reactor. The complete drying system will occupy only 3100 sq. ft.

CLOSE OPERATING CONTROL — means quick, safe start up and shut down, uniform bed temperature maintained with no "over or under drying" of the finished product. And the absence of moving parts within the Reactor itself holds maintenance to a minimum.

For more complete information on the Dorrco FluoSolids system for coal drying, visit our booth at the "Coal Show" or just drop a line, no obligation of course, to Dorr-Oliver Incorporated, Stamford, Connecticut.

FluoSolids T. M. Reg. U. S. Pat. Off.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH · ENGINEERING · EQUIPMENT
STAMFORD · CONNECTICUT · U.S.A.

This model of the new Inland Steel Coal Drying Plant will be displayed in Dorr-Oliver booth No. 731 at the A.M.C. "Coal Show," Cleveland, Ohio, May 13-17.

New A-Line models range from ½-ton Pickups through 33,000 lbs. GVW Six-Wheelers.

NEW ACTION-STYLING! MORE USABLE POWER!

Here is the crowning achievement of fifty years of quality truck production—the great new Golden Anniversary INTERNATIONAL Trucks!

They're *Action-Styled* with fresh, clean functional lines that set a new style pace.

They're powered by new engines that put out more *usable* horsepower—including the most powerful "six" available in its field! They have exclusive new cab mountings for quieter, more level ride. New brakes, new steering, new frames—and many other new features.

The result is a new line of trucks that—more than ever before—are built to cost *least* to own!

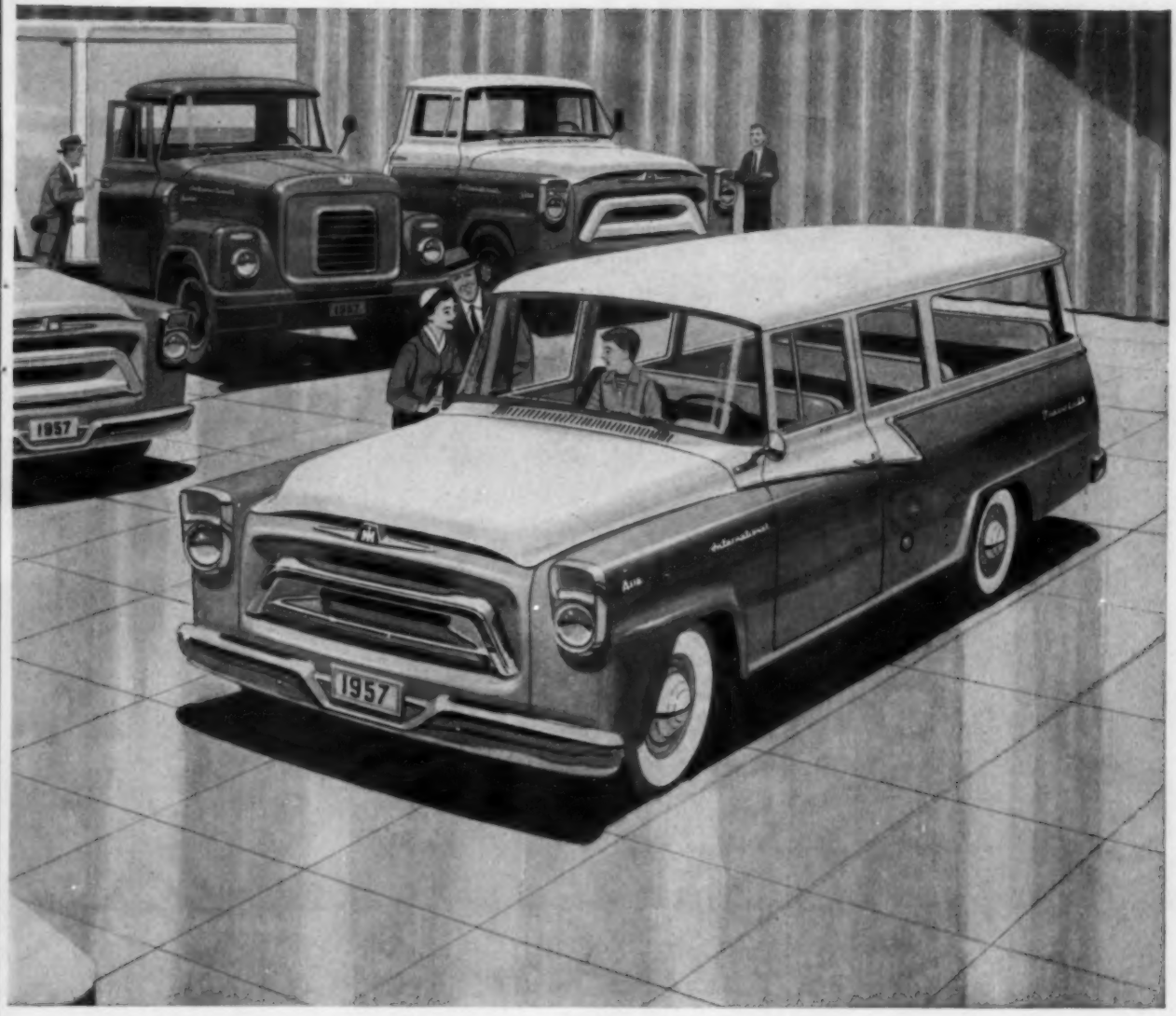
See and drive these newest INTERNATIONALS *today!* International Harvester Company, Chicago.

Trucks Unlimited...Powered for Modern Traffic...Plus Modern Comfort

Handsome "Golden Jubilee" Pickup with the *longest* all-steel body in its class. Only Panel with third door. New 8-passenger Travelall® models. New cab-forward models with ideal 89-inch BC dimension. Tractors to 48,000 lbs. GCW. Wide range of all-wheel-drive trucks.

Redesigned engines produce *increased* power without strain from new combustion chamber and valve position . . . more usable power that's "bred for the job". . . at low rpm to keep operating and maintenance costs low. New quick-starting 12-volt ignition.

Biggest windshield—1,181 sq. in.—and *widest* cab in their class! New "Silent-Vent" door wings. New, wider front and rear springs. Exclusive level-riding 5-point cab mounting. Bigger brakes with more lining area, larger cylinders and boosters for quicker, easier stops.



Other INTERNATIONALS, to 96,000 lbs. GVW, round out the world's most complete line.

NEW Golden Anniversary INTERNATIONALS

Cost least to own!

Motor Trucks • Crawler Tractors • Construction Equipment
McCormick® Farm Equipment and Farmall® Tractors

How Bethlehem trackwork speeds haulage

This smoothly-operating haulage system didn't just grow that way. It was carefully planned in advance to meet the specific needs of the mine, both for the present and for the foreseeable future. And the experienced touch of Bethlehem engineering is clearly evident throughout the layout.

For example all the rail is heavy stuff that will stand up under the pounding of peak traffic loads. All curves are smoothly eased, all tangent sections are truly straight, to permit top speeds without derailment or spillage.

Turnouts and crossings were tailor-made to fit precisely into their allotted spots, and are ruggedly built for the tough grind of high-speed operation. All switch stands, guard rails and other accessories are husky, absolutely dependable and trouble-free.

If all this is beginning to sound a bit luxurious to you, we'd like to clear the air on that point now. Superb as it is, a Bethlehem layout actually costs but a pittance in the long run because of the operating economies it allows.

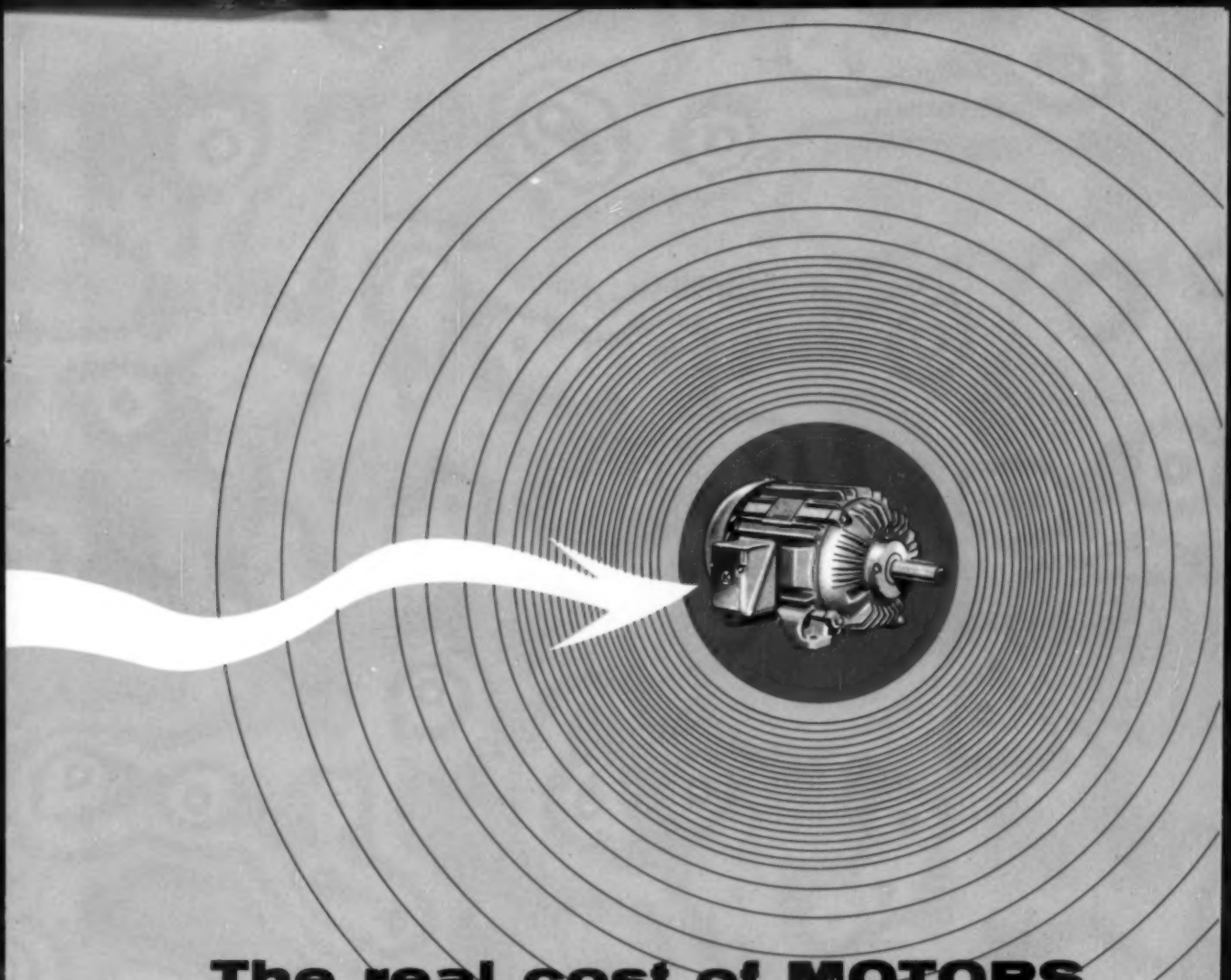
A Bethlehem engineer would like to sit down with you and discuss whatever revamping or expansion you may have in mind. A meeting can readily be arranged to fit your schedule. Simply place a call or drop a line to the Bethlehem office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



The real cost of MOTORS

The cost of a motor extends over its entire lifetime. It does not end with purchase price. Cost *goes up* with every shutdown, every motor maintenance stoppage. Cost *stays down* when you buy quality. And quality means Allis-Chalmers.

All of these extras that don't show on the Allis-Chalmers nameplate — more copper, more iron, more cooling provisions—exemplify the quality-craftsmanship that goes in before the price tag goes on.

For the "long run," either as a new machinery component or as replacement, specify Allis-Chalmers. Find out more about *real* quality in motors from your A-C district office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5287

There's an Allis-Chalmers VIBRATING SCREEN for EVERY Coal Application

For complete information, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

Run-of-Mine SCALPING

A heavily constructed, two-bearing inclined screen for scalping ahead of picking tables or crushers. Floor mounted or suspended. Sizes 4 x 10 to 6 x 16 feet, Model XH, *Ripl-Flo* screen.

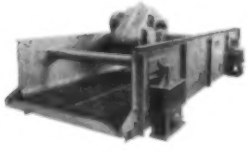
SIZING TO EGG, NUT, STOKER GRADES

An inclined screen used for wet or dry screening of raw coal ahead of washers . . . for preparing egg, nut, stoker sizes . . . for grading and re-screening crushed coal. Sizes 3 x 6 to 6 x 16 feet, Models S or SH *Ripl-Flo* screen. Send for Bulletin 07B6151D.

DEWATERING — SLUDGE RECOVERY — FILTERING

Operates horizontally for maximum effectiveness in primary and secondary dewatering, desliming and recovery of solids to prevent stream pollution. Sizes 3 x 6 to 6 x 16 feet, *Low-Head* screen. Send for Bulletin 07B6330A.

Allis-Chalmers Builds MORE Coal Industry Screens than any other Manufacturer

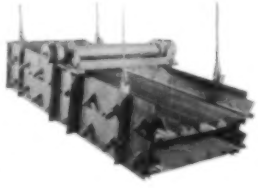


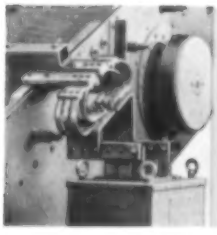
MEDIA RECOVERY

Used for media draining and the washing of coal and refuse, this horizontal screen is available with movable partitions to facilitate handling of both products. Sizes 3 x 6 to 6 x 16 feet, *Low-Head* screen.

AUXILIARY SIZING AND DEWATERING

This modern screen is particularly applicable for sizing coal or middlings following air cleaner, sludge dewatering and dewatering after chloride washer. Sizes 3 x 6 to 4 x 10 feet Model AVS, *Aero-Vibe* screen. Bulletin 07B6099.





SIZING FINE, MOIST COAL — *Thermo-Deck* Heating Unit and *Sta-Kleen* Deck

Low voltage resistance heating of wire cloth eliminates troublesome blinding and increases screen surface life. No downtime to clean screen. Unit can be installed on Allis-Chalmers screens now in use. Send for Bulletin 07B7812.

The *Sta-Kleen* deck, with bouncing balls between cloth and retaining deck, when used with the *Thermo-Deck* unit prevents fine material from baking on screen during interruptions in feed. Send for SN-55.

Thermo-Deck, Sta-Kleen, Ripl-Flo, Low-Head and Aero-Vibe are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5012

36-inch neoprene crossbelt conveyor dumps coal on 900-foot neoprene conveyor running to carloader.

Why neoprene is used at Robena Mine

At the big Robena Mine near Uniontown, Pa., underground conveyor belting is neoprene. In Number Three Panel of 2½ Main, a 30-inch extensible belt used with a continuous miner feeds a 36-inch crossbelt at right angles. The crossbelt in turn dumps coal on the 900-foot, 36-inch mother conveyor for hauling to the carloading point.

Conveyor belting with top and bottom cover of Du Pont neoprene is used at Robena because it offers the balanced combination of properties needed in rough mining service. Neoprene belt gives long-term economy. It's highly resistant to oil and grease as well as deterioration by acid water. It withstands the abrasion and impact of coal, rock, bony. It is tear resistant. And neoprene will not support combustion.

Next time you replace your conveyor belting or buy a new conveyor, be sure to specify neoprene. Its outstanding resistance to oil and grease, abrasion, fire, aging will save you money. To be fully informed on the latest applications of neoprene, fill in the coupon below to receive free your regular copies of our publication, Elastomers Notebook.

DU PONT
REG. U. S. PAT. OFF.

Better things for better living
. . . *through chemistry*

NEOPRENE
— made by Du Pont for 25 years

E. I. du Pont de Nemours & Co. (Inc.)
Elastomer Chemicals Dept. CO-5
Wilmington 98, Delaware

Please put my name on the mailing list for the Elastomers Notebook.

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MAIL THIS COUPON NOW . . . WHILE YOU'RE THINKING ABOUT IT

Handling materials by crane or locomotive?

Read how Pacific Northwest Alloys switched to Michigan Tractor Shovels and . . .

SAVED $5,000 PER MONTH!

THE BACKGROUND

Pacific Northwest Alloys, Inc., is a wholly-owned subsidiary of Chromium Mining & Smelting Corporation of Chicago. Their plant, located just outside Spokane, Washington, produces an alloy known as low carbon ferro chrome from African, Philippine and domestic ores. This new, fast-melting alloy is used in production of some of the new low carbon stainless steels.

THE PROBLEM

Raw materials, such as chrome ore, limestone and quartz, are stockpiled outside the plant. Formerly, locomotive cranes loaded this material into rail cars; these were moved by a switch engine to unloading hoppers. At the time, this seemed the best method of handling the new materials. Then management saw what Michigan Tractor Shovels could do! Result?

Two Michigans replace two locomotive cranes

Two of the old locomotive cranes were retired, along with most of the hopper cars. Two Michigan Model 175A Tractor Shovels now do the entire job . . . moving *several million pounds* of raw materials per month . . . saving approximately $5,000 per month! And that's not all . . .

Weather no longer slows production

The old method of plant feeding was mainly a warm-weather proposition. Raw materials often froze in the hopper cars, simply wouldn't drop—but *production* did, until Michigans were put on the job. Now, transfer of raw materials is fast *and dependable,* no matter what the weather. Despite haul distances of up to ½ mile, *one* Michigan outworks *two* railroad cranes and the large labor crew formerly used during the winter months. In addition . . .

Switching gondolas is another important part-time Michigan job. Here, a pusher-equipped Model 175A puts its four-wheel-drive and 133 hp to work, moving several 100-ton cars over a spur line to the stockpile area.

Michigans permit new sand pit operation

Pacific Northwest Alloys used to *buy* sand, have it shipped in and stockpiled. But now their Michigan Tractor Shovels have made it feasible to open a small sand pit right on Company property. One of the versatile 2¾ yard Michigans digs the plant's daily requirements (about five loads) and delivers it to the unloading hoppers. It's a one-mile haul, but Michigan's excellent speed makes a dump-truck and driver unnecessary—it's actually less costly to let the Michigan do the whole job!

Plant manager reports low maintenance costs

"We use the Michigans two shifts per day, seven days a week on all kinds of jobs," reports Ralph E. Ebersole, Plant Manager of Pacific Northwest Alloys. "They handle material varying from abrasive sand to metallurgical coke (weighing about 30 lbs per cubic foot) to dense chromite ore (weighing over 200 lbs per cubic foot)—yet maintenance costs have been very minor. Savings in both maintenance and labor are more than paying for the Michigans—and we have absolute assurance of uninterrupted production, regardless of weather!"

If performance like THIS appeals to YOU

. . . get in touch with your local Michigan Distributor. He'll be glad to arrange an in-plant demonstration that'll show you just how Michigan Tractor Shovels can improve your profit picture. Count on him, too, to recommend the *correct* size Michigan for your specific operation—there are eight basic models and 38 buckets and attachments ranging in capacity from 6 cubic feet to 6 cubic yards. Choose the finance plan best suited to your investment program, too—including the popular Michigan Lease-Purchase Plan, which lets you put one or more Michigans in your plant without laying out a penny of capital.

Michigan is a registered trade-mark of

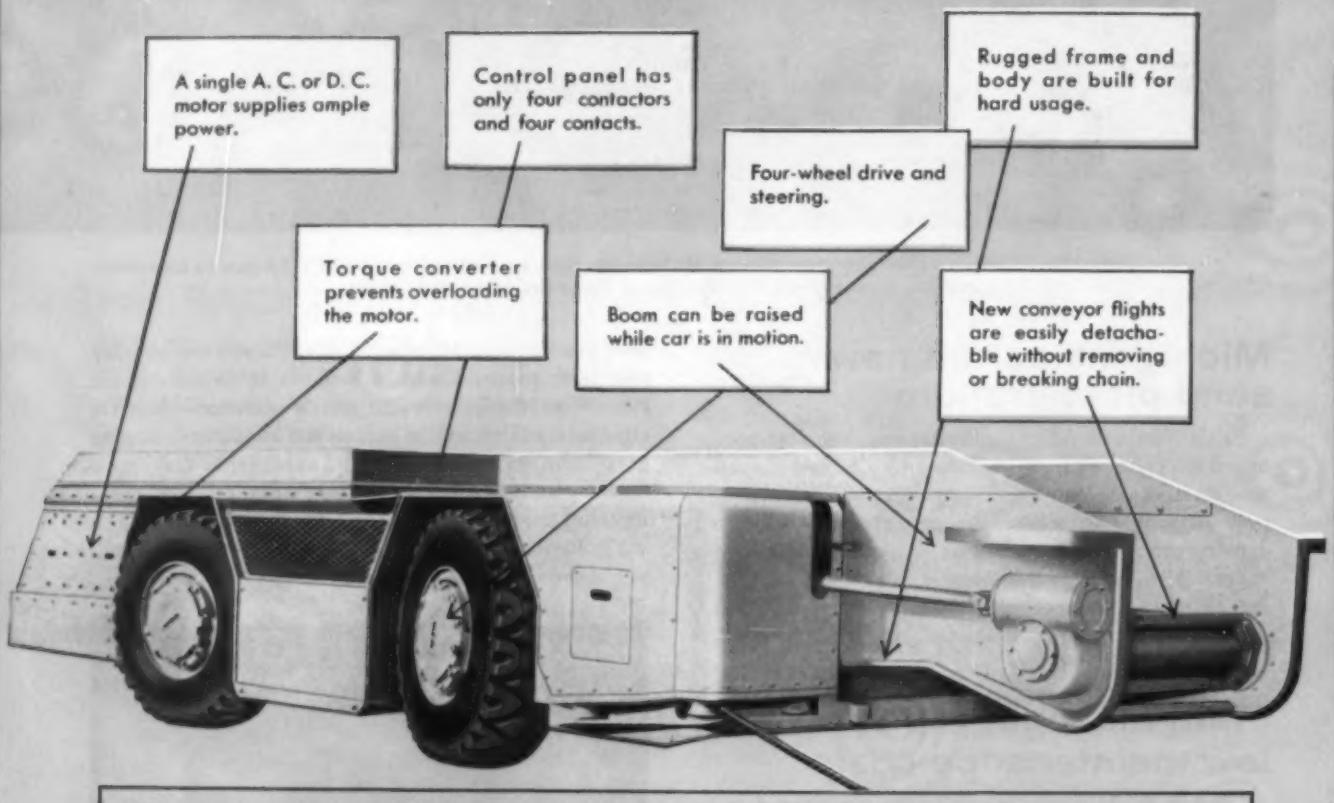
CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2473 Pipestone Road
Benton Harbor 23, Michigan
In Canada: Canadian Clark Ltd., St. Thomas, Ontario

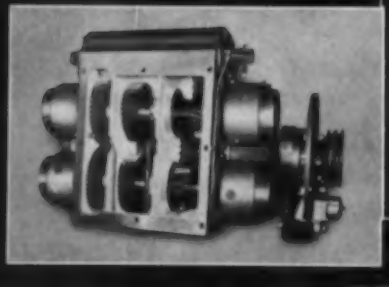
MAINTENANCE COSTS CUT 80% HANDLING 8,500 lb/yd ALLOY

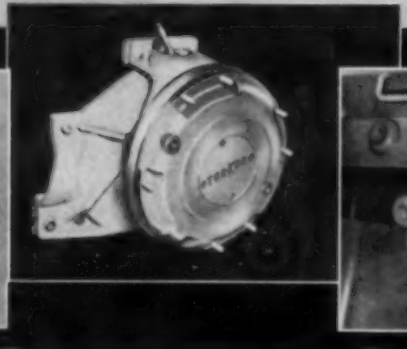
When Pacific Northwest Alloys had another problem, they did just that . . . got in touch with their local Michigan Distributor in Spokane. This time, they sought an end to the extremely high maintenance needed on their small loaders used indoors to move low carbon ferro chrome to plant shipping tables. A 16 cubic foot Michigan Model 12B was put on trial. Today, Pacific Northwest Alloys has four of these machines. They have replaced *five* of the old 14 cubic foot loaders. Maintenance costs are only ⅙ of what they were formerly.

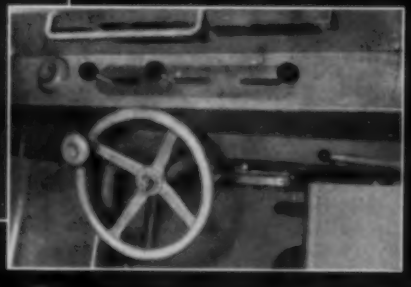
Designed by Mining People to Meet Modern Needs . . .


A single A. C. or D. C. motor supplies ample power.
Control panel has only four contactors and four contacts.
Rugged frame and body are built for hard usage.
Four-wheel drive and steering.
Torque converter prevents overloading the motor.
Boom can be raised while car is in motion.
New conveyor flights are easily detachable without removing or breaking chain.

You are cordially invited to make our booths your headquarters at the Exposition, May 13-16.
2029-2128 Upper Lakeside Hall • 2605-2613 Lower Lakeside Hall • Cleveland Public Auditorium







Constant-mesh transmission gives three speeds forward and reverse.

New-type, heavy-duty wheel units are interchangeable.

Controls are simple and conveniently located.

The New National Mine TORKAR*

A. C. or D. C. Shuttle Car

The National Mine Torkar was developed and first built by one of the nation's leading mining companies, using the talents of one of the industry's leading consulting engineers. Operating and maintenance problems encountered in the past were analyzed and present trends in mining were projected in order to envision the problems which might arise in the future.

Engineers were called upon to provide a design which would take care of every requirement considered essential by the operating and maintenance men. The Torkar met the expectations of the mining executives so well that it was decided to turn the car over to National Mine in order that it might be available to the entire mining industry.

Since electrical equipment is the chief source of maintenance costs, it was decided to simplify the electrical system as much as possible. A single, large, non-reversing, fan-cooled motor supplies all of the power requirements, and the control panel has only four contactors and four contacts. To protect the motor against overloading and the resultant damage, a torque converter takes the motor output and transmits it to the constant-mesh transmission. The converter also makes it possible to install either A. C. or D. C. motors, or to convert from one to the other simply by changing the motor, its controls and the cable reel—one of the forward-looking features.

Another source of maintenance costs was greatly reduced by using newly designed, heavy-duty wheel units which are not affected by housing mis-alignments. They employ a spur gear-and-pinion drive having a high torque capacity. The gearing runs in oil. Wheel units are completely interchangeable. The heavy plate bodies and reinforced frames are capable of withstanding years of hard usage. The cars are provided with automatic or zoned lubrication.

All possible operating conveniences were incorporated into the Torkar design. Four-wheel drive and steering, and three speeds forward and reverse make the car very maneuverable. Hydraulic power is sufficient to permit raising the boom while the car is in motion without impairing the steering. Because the hydraulic system has two pumps, one of them driven by the transmission rather than the motor, there is hydraulic pressure to steer and reel as long as the car is in motion—even in event of power failure.

Designed to meet the exacting demands of experienced operating and maintenance men, the Torkar is the most advanced and economical shuttle car available today. Since it has a single prime mover, it can be converted to A. C. or D. C. power quickly and inexpensively without construction alterations. Let your National Mine representative give you full details on this car, or write for literature—today.

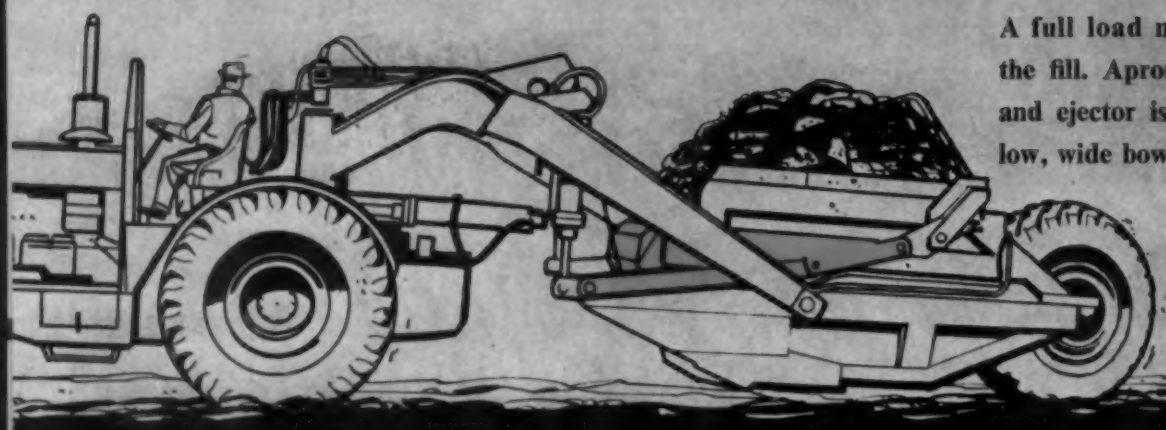
*Trademark

National Mine Service Company

National Mine Service Company

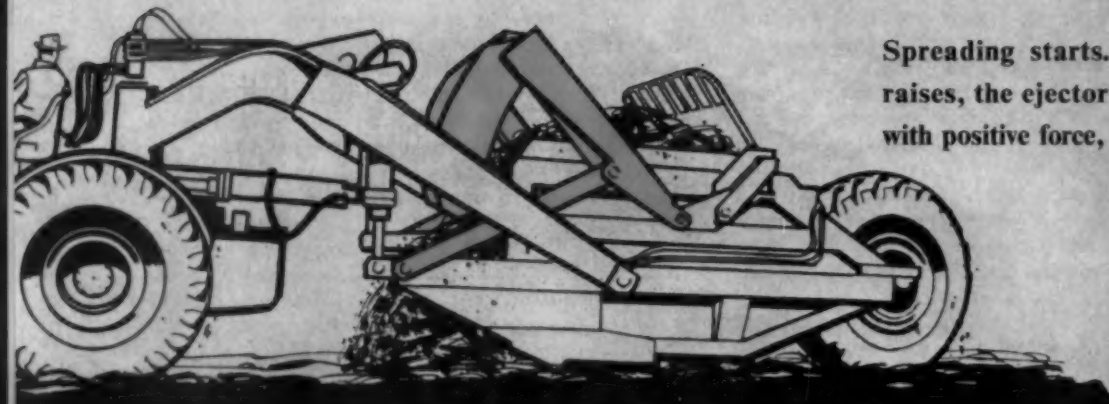
564 Alcoa Building • Pittsburgh 19, Pennsylvania

All-State Division, Logan, W. Va.
Anthracite Division, Forty Fort, Pa.
Ashland Division, Ashland, Ky.
Bemeco Division, Beckley, W. Va.
Kentucky-Virginia Division, Jenkins, Ky.
Western Kentucky Division, Madisonville, Ky.
Whiteman Division, Indiana, Pa. Morgantown, W. Va.



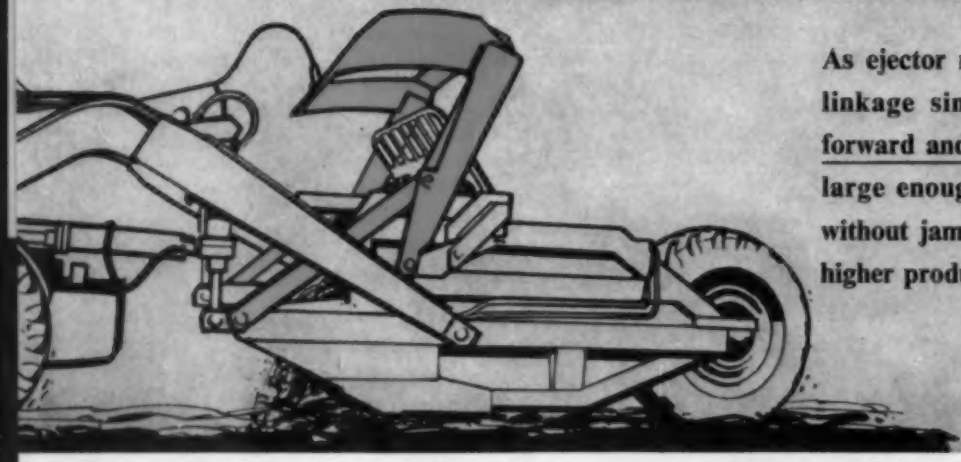
A full load moves on to the fill. Apron is closed, and ejector is at rear of low, wide bowl.

How Allis-Chalmers' patented 3-point scraper linkage



Spreading starts. As the apron raises, the ejector moves forward with positive force, accurate control.

assures fast, clean, controlled spreading of any material



As ejector moves toward cutting edge, linkage simultaneously moves apron forward and upward, providing opening large enough to let any load fall free without jamming. Result: faster cycles, higher production, more profit!

Only your nearby Allis-Chalmers dealer can offer you this important advantage. See it demonstrated now . . . on either motor or pull-type scrapers. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

J&L CENTERFIT WIRE ROPE

toughest combination of strength and flexibility ever designed

On jobs where shock, severe bending and extreme loading are a problem, CenterFit wire rope gives you extra service life.

CenterFit is your best wire rope for back hoe pull ropes, shovel hoist ropes and clamshell holding and closing lines where overloading may occur. Here's why:

- CenterFit is the strongest standard wire rope produced
- More external and internal bearing surface
- Greater flexibility
- Extra metallic area of the cross section with more equal stress distribution among the strands

CenterFit's longer service life means less down time, lower operating costs. Send coupon today for complete information.

Jones & Laughlin Steel Corporation
Wire Rope Division
Muncy, Pennsylvania

☐ Please send literature on CENTERFIT wire rope.
☐ Have representative call.

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Title_____

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STEEL ...a great name in steel

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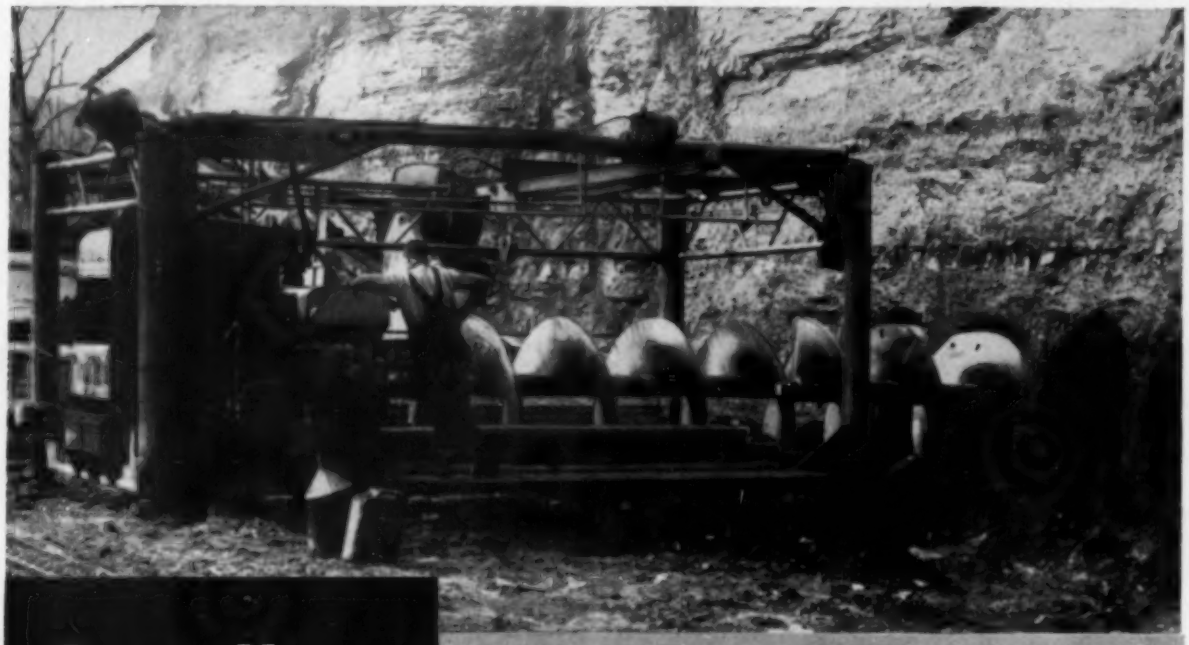
CARDOX presents 5 practical answers to rising costs



CARDOX® AUGERMINER

MODEL 235

for lowest cost continuous SURFACE COAL MINING — UP TO 700 TONS A DAY

The most economical method for mining coal, on a per ton basis! Operating easily in any 26-foot pit, the Cardox AugerMiner, Model 235, drills under the overburden to bring out pure coal—from holes up to 50" in diameter. With only a 3-man team, it can work almost continuously because it is *self-positioning* and *self-moving*. As the AugerMiner spans *two* holes, *augers are stored in the completed hole and recovered as needed for extension into the new hole to any practical length desired.* Providing the BIG power you need, the CARDOX AugerMiner is an extremely rugged machine that needs minimum maintenance. Its simple design also makes maintenance easier.

SEE THE CARDOX AUGERMINER IN ACTION AT THE COAL CONVENTION

Demonstration at CARDOX Outdoor Booth #550, will simulate operation in continuous surface coal mining.

CARDOX

PRODUCTION!

. . . see them at the COAL CONVENTION

new improved

semi-portable

AIRDOX

compressor

The familiar AIRDOX Compressor is now available with either rubber-tired wheels or flange wheels for track use. Mounted on a heavy-duty frame with towing bar, this semi-portable unit can be readily moved from place to place within the mine. Components arranged "in-line" permit narrower width for easy mobility. SEE THIS IMPROVED MODEL FOR THE FIRST TIME AT THE CARDOX BOOTH AT THE COAL CONVENTION.

At the Coal Convention . . . see also the Standard AIRDOX Compressor on exhibit . . . the time-tested "workhorse" of non-explosive mining with a proven record of hundreds of millions of tons of coal produced economically.

new model

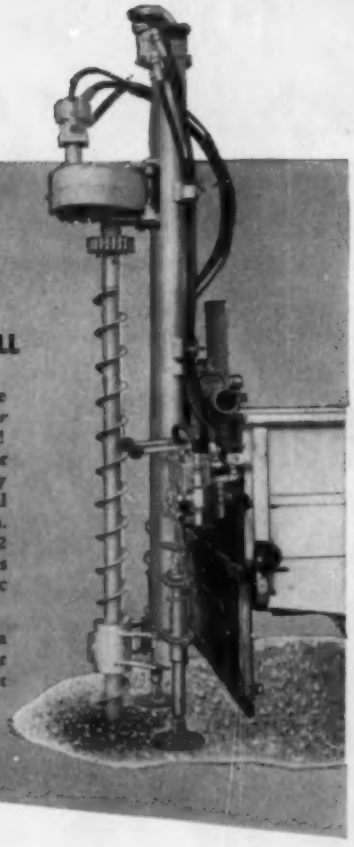
CARDOX

hydraulically powered

GENERAL PURPOSE DRILL

You'll probably agree, it's the most downright *usable* drill, *for more jobs*, than you've ever seen! Mounts on any truck, crawler or farm tractor . . . and drills at any angle from horizontal to vertical and in any lateral direction. Handles augers from 3 to 12 inches in diameter, at feed rates up to 20 fpm. All-hydraulic power and controls.

Dismounted, it doubles as a trench drill or can be used for horizontal drilling at different levels.



new **CARDOX**

horizontal hydraulic

HEAVY DUTY DRILL

A brand new, more powerful drill to speed up high wall or bank drilling of blast holes. Just roll it up to the job and drill. New water-cooled engine is amply powered to handle drills up to 8' in diameter. The new hydraulic coupling provides virtually shock-free transmission of power to the drill, saves wear and tear. Wide, rigidly reinforced frame insures stability in operation. Unit is also available in a self-propelled model.

remember

AT THE COAL CONVENTION CARDOX WILL HAVE TWO SEPARATE EXHIBITS

INDOORS at Booths 2023 and 2122 where all equipment (except the AugerMiner) described here will be on display.

OUTDOORS at Booth 550, where the CARDOX AugerMiner, Model 235, will be in operation, simulating continuous surface coal mining.

AT BOTH BOOTHS the CARDOX exhibit staff will be on hand to answer all your questions. Make it a date to visit us!

CARDOX CORPORATION • **307 North Michigan, Avenue** • **Chicago 1, Illinois**

WAREHOUSES and DISTRICT OFFICES

Harper, West Virginia
Phone: Beckley—Clifford 3-4812

Benton, Illinois—Box 537
Phone: Benton 8-3821

St. Clairsville, Ohio—Box #1
Phone: St. Clairsville 619

Pikeville, Kentucky
Route 2, Box 571
Phone: Robinson Creek 5

Louisville, Colorado
Phone: Boulder
Hillcrest 2-7298

Library, Pennsylvania
Box 427
Phone: Tennyson 5-6910

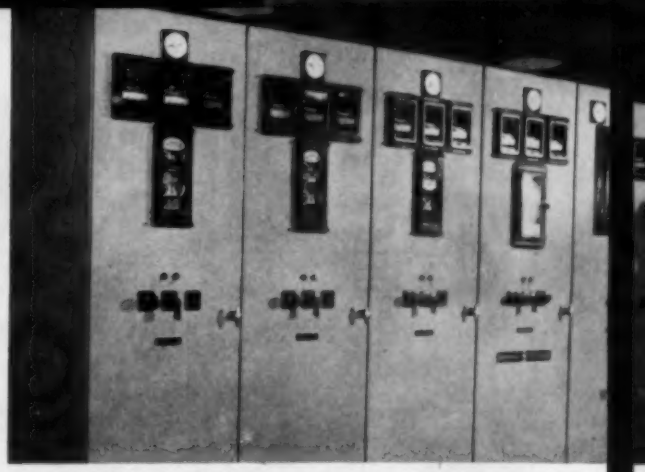
Camden-on-Gauley, W. Va.
Phone:
Camden-on-Gauley 2181

Evansville, Indiana, Box 84
307 Northwest Fifth St.
Phone: Harrison 2-8944

Ottumwa, Iowa
Phone: Ottumwa
Murray 4-6564

ENGINEERING REPORTS:

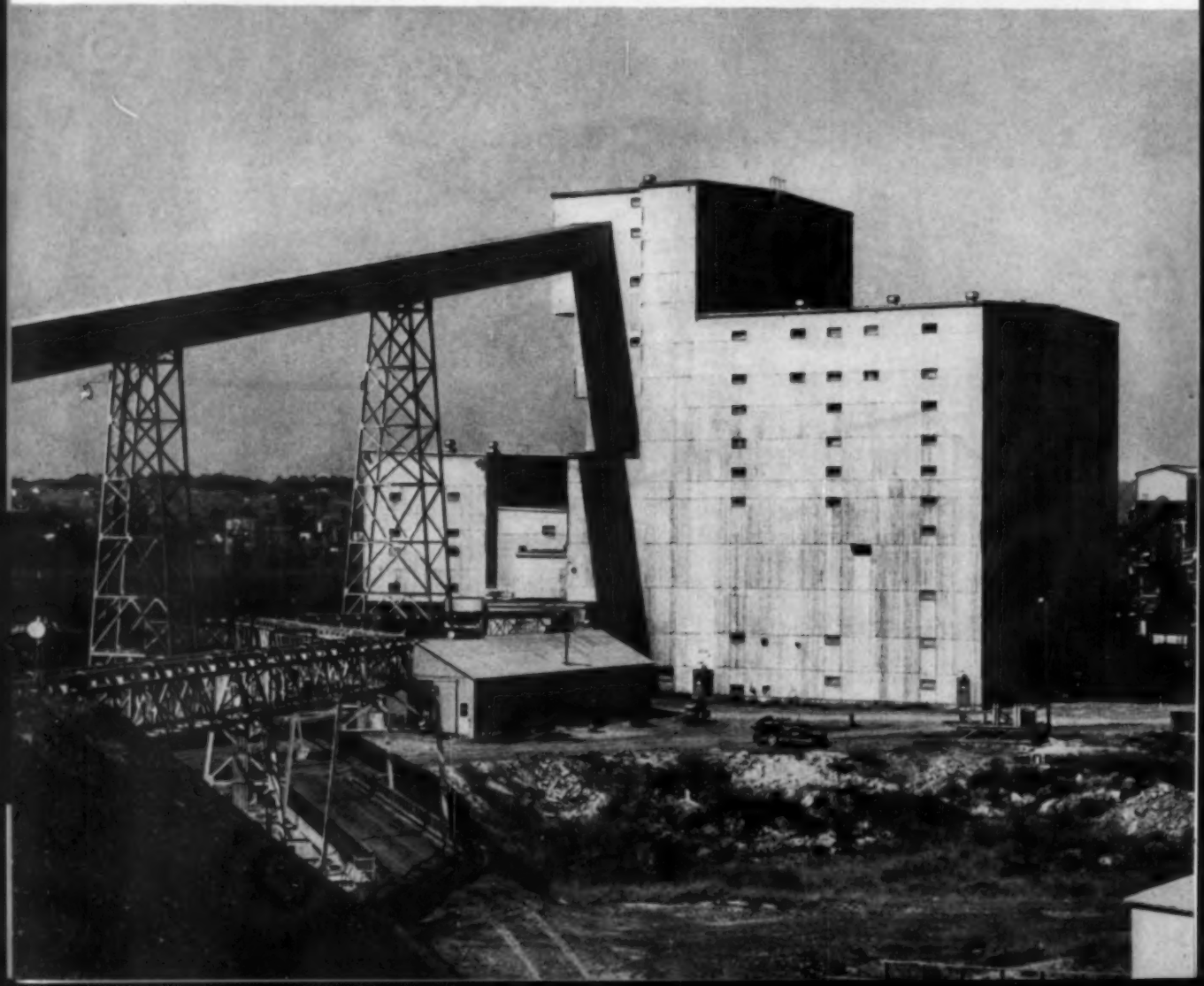
MINIMUM LINE VOLTAGE DROP is obtained by locating G-E unit substations near the load. The substations above, rated 750 kva and 500 kva, are two of five which serve the Corbin preparation plant.

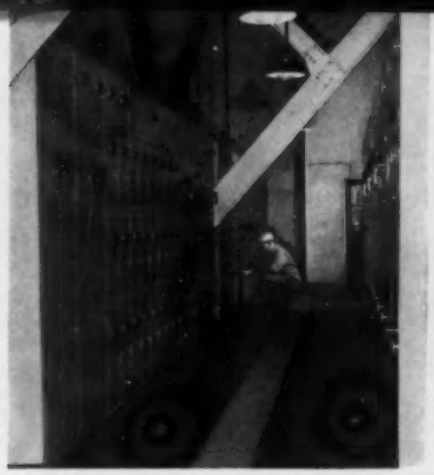


ADEQUATE INTERRUPTING CAPACITY, provided by General Electric metal-clad switchgear, helps protect preparation plant equipment and reduces down-time. Units are shipped assembled to save installation time and cost.

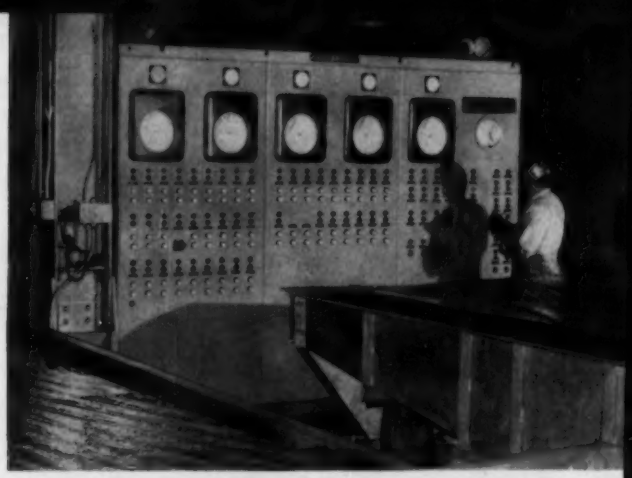
General Electric engineered system helps

DESIGNED FOR EXPANSION to 1200 tons capacity per hour, the Corbin plant processes coal for steel mills.





CENTRALIZED CONTROL for low voltage motors is provided by compact G-E Cabinetrol* panels. Expansion is easily handled by adding new sections to existing lineups.



SIMPLIFIED starting and stopping of all motors in Corbin plant is afforded by two General Electric master control boards for both fine and coarse coal processing circuits. Unit shown above hangs from ceiling to avoid vibration.

Corbin Coal Plant increase output

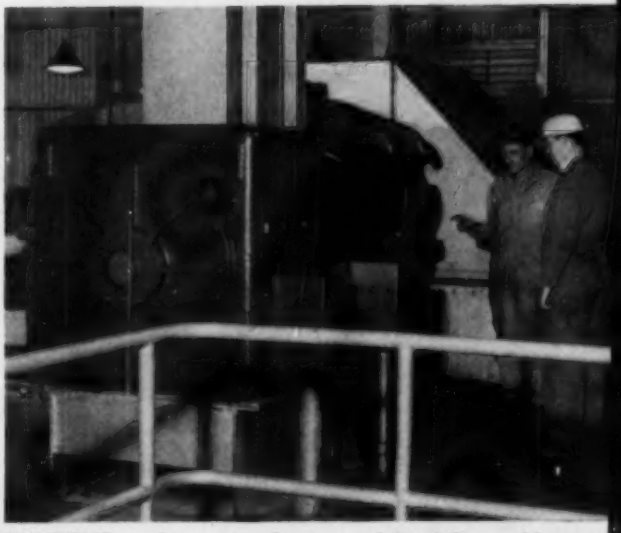
Integrated General Electric power distribution and drive units help achieve continuous processing of uniform-quality coking coal

At its new Corbin, Ky., coal preparation plant, U.S. Steel processes and blends coals to a uniform low ash-content for use in steel mill coking ovens. The plant is designed to process coal at the rate of 600-tons-per-hour. However, the raw coal incoming feed belt is designed to handle a 1200-tons-per-hour capacity. The plant and electrical system are laid out to permit this later expansion.

General Electric system engineers worked closely with U.S. Steel and its prime contractor, Allen & Garcia Co. of Chicago, to provide a flexible, well-integrated power system. Such a system helps minimize outages, reduces maintenance costs, and processes more tons of coal per man-hour of labor. A feature of the distribution system is the provision made for expanding facilities through addition of new load-center unit substations to plant primary power systems.

Co-ordinated in the electrical system are 165 General Electric motors totalling 5490 horsepower and controlled by compact G-E Cabinetrol* motor-control centers. Carefully timed delivery of General Electric equipment to meet the installation schedule allowed the plant to begin operation earlier than expected.

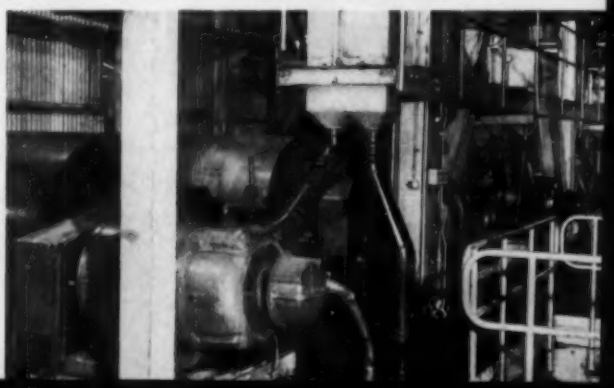
Whatever your electrical needs, General Electric engineers and equipment can work for you. Contact your nearest Apparatus Sales Office or write for Bulletin GEA-5308. General Electric Company, Section 663-46, Schenectady 5, N. Y.



PROTECTED against wear, damage and breakdown, this General Electric 350-hp Tri-Clad* wound rotor motor drives Corbin coal preparation plant's 830-foot by 54-inch incoming raw coal feed conveyor belt to a height of 150 feet.

*Registered trade-mark of General Electric Co.

STURDY, totally-enclosed 150-hp General Electric motors, offering protection against abrasive coal dust and corrosion with new "miracle" insulations, drive centrifuges for dewatering coal in Corbin plant's fine coal processing department.



COAL SHOW MAY 13–16

While attending the American Mining Congress Coal Show this month at Cleveland Public Auditorium, see General Electric's exhibits, Booths 1828 and 1834.

Engineered Electrical Systems for the Coal Industry

GENERAL ELECTRIC

Want higher productivity—

Get both with LONG

New Long Model 88-C Pigloader*

For Piggyback* Conveyor Mining

Overall Operating Height—25¼ inches
Weight—14,000 pounds.

These new Pigloaders feature low operating height, simplified design and operation, minimum maintenance, and full independent crawler control. The single 40 HP electric motor drives all machine operations, with power transmitted to various functions through a simple combination of gear and chain drives. All functions are controlled hydraulically from a single bank of fingertip control valves. Maximum digging power results from application of extremely heavy duty gathering transmissions, plus the ability to employ the full 40 HP for this as well as other operations. Rated capacity—4 to 6 tons per minute; tramming speed—95 feet per minute; conveyor chain—heavy duty, 58,000 pounds ultimate strength.

New Long Model 188-C Pigloader

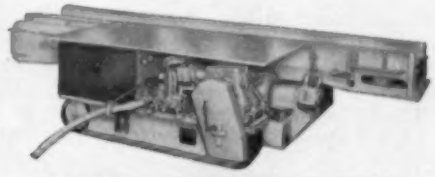
For Shuttle Car Loading

Overall Operating Height—26½ inches
Weight—15,000 pounds.

Trade Marks Reg. U. S. Pat. Off.

Long Piggyback Bridge Conveyors

The LONG Piggyback is the original "bridge" conveyor, with basic features patented. Because it eliminates lost time for shuttle car changes, Piggyback mining assures continuous haulage and a high percentage of loading time—whether utilized with conventional loaders or with continuous mining machines. The PT-15-B (illustrated) is especially suitable for use with the 88-C Pigloader. For low seams, the new LONG PT-18 Piggyback has a receiving height of only 11".

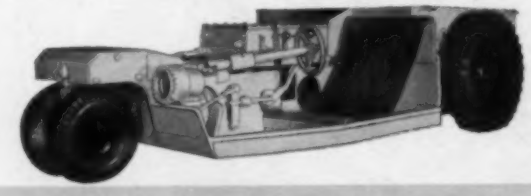


Long Mobile Room and Gathering Conveyors

The LONG Mobile Conveyor reduces moving time by as much as 60 per cent. Because the conveyor drive is crawler mounted and self-tramming, one man can relocate it in minutes. Tramming speed—45 fpm, capacity—5 tons per minute, and operating length—more than 400 feet. Available in Model M-400 (open-type pan track return) and M-500 (solid-type recirculating pan track return) with pan widths of 12 and 15 inches and pan depths of 5, 7 and 9 inches. The M-500 series eliminates fine coal accumulation under the pan line, and cleaning up after this conveyor is unnecessary.

New Long Mobile Hydraulic Coal Drill

Coal drilling becomes a one-man operation with the new LONG Mobile Hydraulic Coal Drill. Two lightweight aluminum drills are available—the 1-M-20 (one-man, 20 pounds) for drilling average holes and the 1-M-30 (one-man, 30 pounds) for larger holes or drilling in hard coal. 12-20 seconds is required to drill the average hole WITH ONE MAN. The self-tramming hydraulic power unit designed for these drills also can be used with a trailer for supply haulage or conveyor pan movement.



New Long Battery Tractor-Truck

Equipped with U.S.B.M. permissible approval plate, the new LONG Model D-2375 travels at a speed of 4 miles per hour and can quickly move trailers carrying sufficient supplies for an entire working shift, plus the men, to the section. Available in machine heights of 26" or 30", it incorporates explosion-proof U.S.B.M. approved type electrical equipment with full magnetic control, and two-speed operation in each direction.

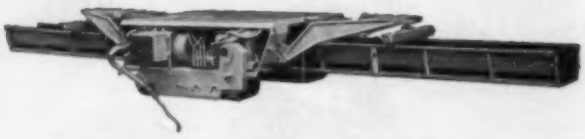
lower operating costs?

EQUIPMENT

FOR

Continuous loading... Mobile conveyor mining

Side-Lift Type—Model 2347.

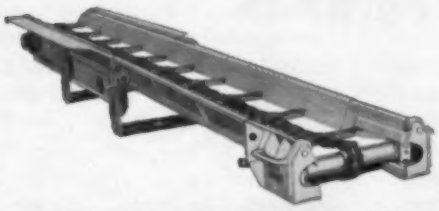


Straddle Type—Model D-2111

New Long Conveyor Pan Transporters

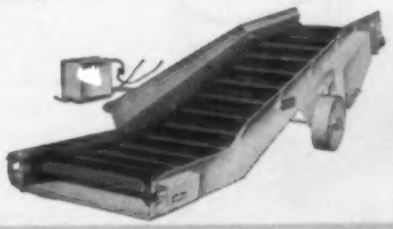
Designed specifically for application of the LONG Piggyback Conveyor System to continuous mining, these pan transporters permit quick, easy additions to the room chain conveyor to keep pace with rapid advances by continuous mining machines. The straddle type, powered by two U.S.B.M. permissible 5 HP motors, can transport *at one time* six or seven conveyor pans (each 6' long), plus tail piece.

Powered by one permissible 10 HP motor, the side-lift type has two side-lifting booms for transporting three conveyor pans, plus tail piece, to extend the room conveyor. Also included with this model is a hydraulic driven winch with 150 feet of wire rope.



Long 400-DBH Skid-Mounted Conveyor

High capacity transportation is provided by the LONG 400-DBH, 15-inch room and gathering conveyor, designed for LONG Piggyback Conveyor Mining. Furnished with 5", 7" or 9" deep pans—the 400-DBH offers capacity to 300 tons per hour in maximum lengths of 500'. Standard chain speed is 196 fpm.



Long Type 640 Elevating Conveyor

Provides high-capacity transportation as either a shuttle car elevator or an elevating conveyor in the LONG Piggyback Mining System. It offers the strongest chain and flight combination in an underground elevating conveyor, and its 10¾" height makes it desirable for receiving shuttle car loads. Open or permissible type electrical equipment.

The LONG Company
OAK HILL, W. VA.

MAIL COUPON FOR COMPLETE INFORMATION!

Gentlemen:

☐ Please send details on the complete line of LONG Equipment

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

TIGERWELD BONDS

More welding area for the strongest possible joint

TYPE BF-12

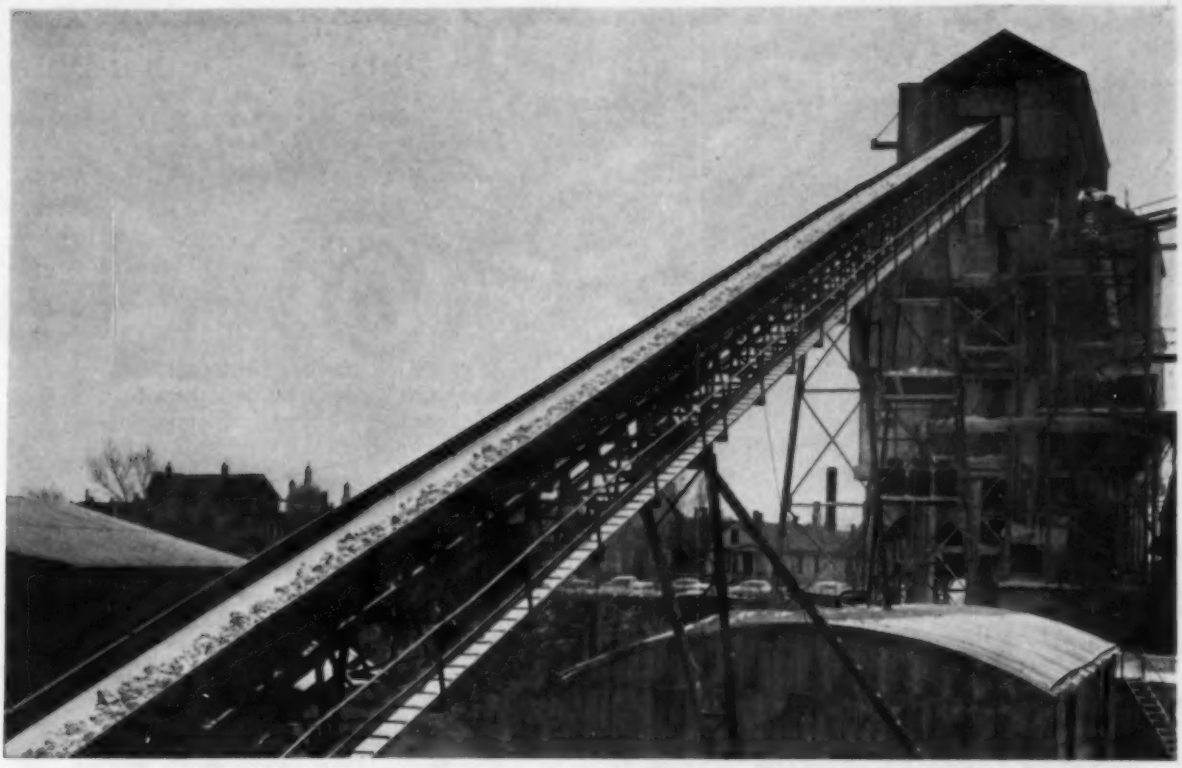
TIGERWELD BF-12 Rail Bonds are really rugged. Heavy steel terminals are permanently flash butt-welded to the strand. And a raised shoulder on each terminal lets you lay on extra weld metal . . . gives you an unusually strong joint that adds to the durability and reliability of this heavy-duty bond.

For other jobs, you will find other TIGERWELD BONDS perfectly suited to your needs. Consult the nearest American Steel & Wire Sales Office for bonds . . . for service . . . for advice on any bonding problem.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

UNITED STATES STEEL



Barber-Greene Idlers provide extra years of low cost operation . . . the ultimate in belt protection.

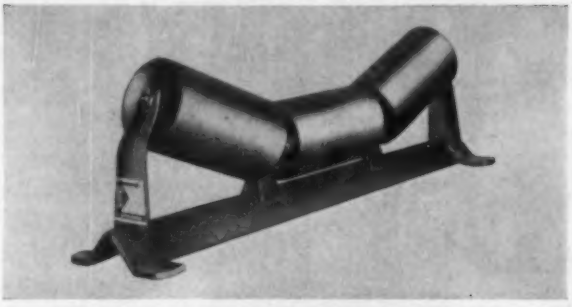
Barber-Greene Idlers . . . still rolling after twenty years

Installed 20 years ago, Barber-Greene Idlers are still rolling at this Material Service Corporation plant in Chicago.

There are no secrets behind the long-life records established by Barber-Greene Idlers. Advanced design plus top-quality materials, plus precision manufacture with the most modern production machines make the difference. The user benefits in lower maintenance costs, less down time, and longer idler life.

Barber-Greene advantages include virtually unbreakable jig-welded base frames, self-shedding base angles, interchangeable rolls made of heavy steel tubing, seamless steel grease reservoirs of ample capacity, and two-degree tilt to facilitate belt alignment.

Whether it's a ball bearing unit for normal service, or a roller bearing unit for the most rugged conditions, Barber-Greene has the idler that's right for any conveyor . . . right for any job.



Available in widths from 16" to 60", with 4", 5", or 6" rolls, the Barber-Greene line includes standard troughing carriers and return rolls, flat belt and picking table carriers, self-aligning carriers and return rolls, grain idlers, rubber impact carriers, and self-cleaning return rolls.

56-22-IPE

Write for literature on the complete Barber-Greene idler line.

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Permissible Pete

In every job, there are always a few
who work harder than the others do.
Of these few, there is always one
that sees the job is correctly done.

Such a man is Permissible Pete,
toughest man you'll ever meet.
Whether judged by brain or measured by might,
he stands out front clear as day from night.

Coal is his business, blasting his task
(underground mining to those who ask)
But let's take a look at part of his day
and follow Pete along his toilful way.

Out at the mine as the dawn unfolds
he's anxious to find what the new day holds.
By checking his tools and seeing his crew,
he knows they're ready to start work anew.

Down into the mine and up to the face
where today's blasting will soon take place.
After undercutting the coal, Pete proceeds
to drill blast holes in the pattern he needs.

Then Permissible Pete shows us why
he's regarded as such a brainy guy.
Into each hole he expertly applies
permissible charge that Austin supplies.

With Austin dynamite, there's no doubt
about the results that now come about—
large lump coal with hardly any fines,
just what's wanted by profitable mines.

With coal quickly loaded, the men begin
the same operation all over again.
And so it goes as time passes by,
with daily tonnage exceptionally high.

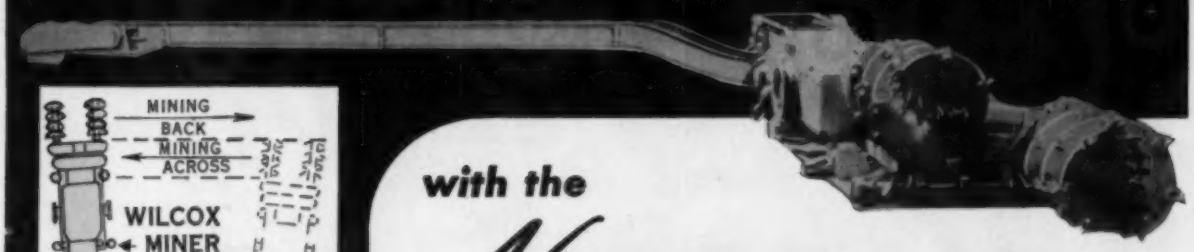
* * * * *

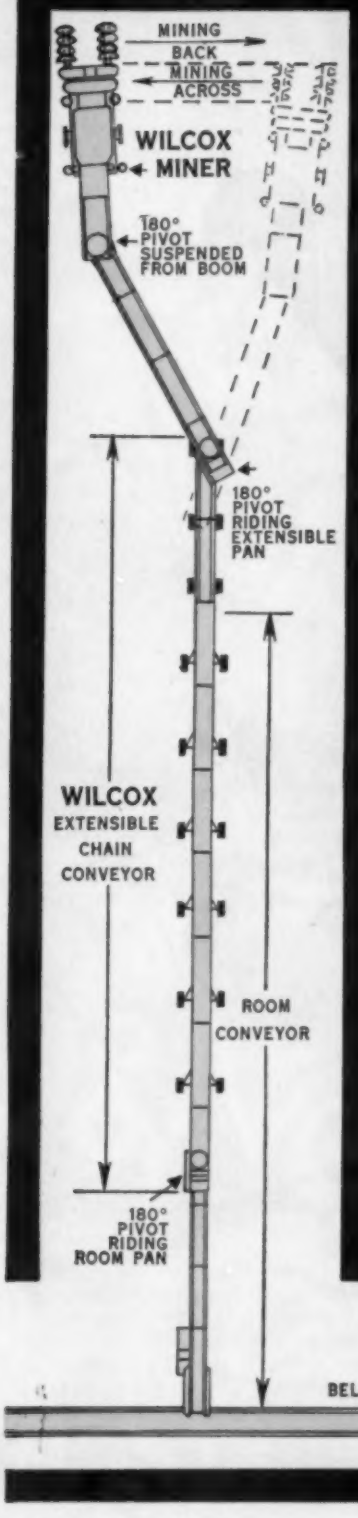
If Pete were asked, he'd probably say
"We're boosting production the Austin way."
Then he'd continue proving to you
Austin permissibles can boost yours too.

USED IN 1833 AUSTIN & EVER SINCE

AUSTIN POWDER COMPANY
CLEVELAND 13, OHIO

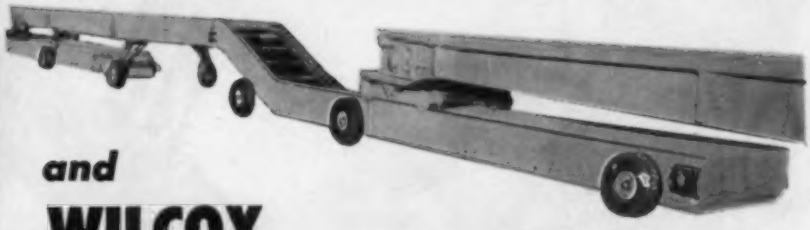
IT'S HERE! TRUE CONTINUOUS MINING





with the

New WILCOX MINER



and

WILCOX
EXTENSIBLE CHAIN CONVEYOR

THE WILCOX CONTINUOUS MINER is producing coal in West Virginia, Pennsylvania, Virginia, and Alabama. Working since January, 1955 in various seams of coal 28 to 46 inches thick, with such satisfactory results that 95% of the customers have repeated orders.

THE WILCOX CONTINUOUS MINER

- ★ IS the lowest continuous miner on the market today in height, cost, and maintenance
- ★ IS producing up to 250 tons per shift with only 3 men at the face
- ★ IS satisfactorily producing coal under roof conditions where other mechanical equipment has failed

THE WILCOX EXTENSIBLE CHAIN CONVEYOR is the missing link to true continuous mining. Tried, tested, and proven to have many successful features such as

- ★ No down time for panning up during a shift
- ★ Assures a continuous flow of coal from face to outside without spillage
- ★ Assures more working hours per shift
- ★ And higher continuous tonnages

RESULTS: MORE TONS PER MAN — LESS COST PER TON

See it at the Coal Show

Booth 2538

WILCOX
MANUFACTURING COMPANY

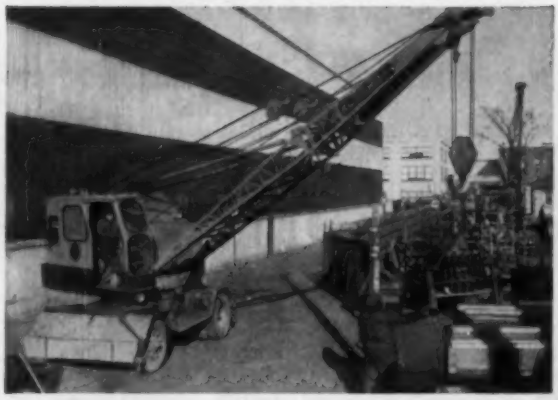
P. O. BOX 217 • RALEIGH, WEST VIRGINIA

KOEHRING WORK CAPACITY *in action . . .*

Quarry rock — Take another look at the heavy-duty shovel (above), loading rock at a Midwest quarry. It's the new Koehring ¾-yard 305, with 18-foot deep-section boom, and 15-foot dual dipper-sticks. In heavy digging like this, operators like the light lever-pull of its big power clutch, and accurate "feel" of load. *You'll* like its *extra work capacity* with all attachments, on crawlers or rubber (see ratings on next page).

Mining phosphate — After stripping overburden at a Southern mine (right), 605 dragline loaded phosphate out of the deep cut. It has plenty of work radius for this type of operation — can be used with 50 to 110 feet of boom, and handles 1½ to 2½ cu. yd. dragline or clamshell buckets, depending on weight of materials. Better check what this big Koehring 605 can do on your excavating, lifting and material-handling.

21.5 m.p.h. Cruiser® — One man controls all operations, one engine supplies all power for work and travel on the new Koehring 205 Cruiser Crane. There's a full range of low working speeds to 7 m.p.h. — plus travel speeds up to 21.5 m.p.h. Has smooth torque-converter drive, power-steering, climbs 30% grades. Usefulness is unlimited in mines, pits and quarries. It lifts up to 15 tons — handles ½ to ¾-yard clamshell or dragline buckets — converts to shovel or hoe. Versatile Koehring 205 also is available on truck mounting or on heavy-duty crawlers (more details below).



Stockpile specialist — Owner of this yard put stockpiling on a big-tonnage basis with a 405 clamshell crane. Its smooth swing, fast line speeds, and wide work radius pay off on all kinds of material-handling. This 405 is another in the modern, new series of Koehring excavators and cranes. Want more information? Call your Koehring distributor today.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-foot radius
205 ON RUBBER	½-Yd.	30,000 lbs. 13,700 lbs.	at 12-foot radius at 20-foot radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-foot radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-foot radius at 30-foot radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-foot radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-foot radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 13-foot radius

KOEHRING COMPANY Milwaukee 16, Wis. Subsidiaries: JOHNSON PARSONS • KWIK-MIX

Air-Tool Maintenance Tips That Help Keep Costs Down

by LE ROI

Not many machines take the beating that rock drills and paving breakers do. Steel strikes steel 2,000 blows a minute, with a cumulative impact of 40,000 foot-pounds every 60 seconds.

Despite the rough usage rock drills get, preventive maintenance pays off. Here are a few of the basic things you can do easily—to keep your tools running longer and keep your costs down:

Le Roi-Cleveland automatic air-line oiler and 10-ft. whip hose. Capacity one quart.

(Right) New 2-gallon air-line oiler. Automatic. Designed for wagon-drill and jumbo service.

★ ★ ★

See that your machines get plenty of oil. This is of vital importance. There are no piston rings in a rock drill, so the piston must fit the cylinder with practically zero clearance. If lubrication is neglected, hardened steel parts score and break.

Fill the integral lubrication chamber in the drill at the start of each shift and after every 3 hours of operation. Better yet, use a Le Roi-Cleveland air-line lubricator placed 10 feet from the machine. This type of lubricator needs filling only once each shift; the flow of oil can be adjusted as desired.

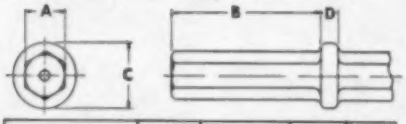
Le Roi-Cleveland Veribest rock drill hose. Oil- and heat-resistant.

Use only good hose and pipe. Pieces of rubber from oil-rotted hose will clog your drill so that it can't run. Scale from old rusty pipe can score the cylinder of your machine and result in expensive repairs.

We recommend the use of Le Roi-Cleveland "Veribest" hose. It was designed especially for rock drill service, with an abrasion-resistant outer cover and a special inner liner that resists the corrosive action of oil and hot air.

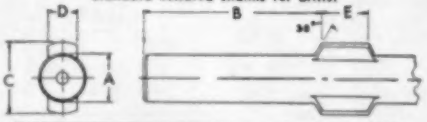
Be sure your drill steel shanks are properly sized and tempered. Undersized shanks cause rapid chuck wear that leads to broken pistons. Short shanks and long shanks reduce the force of blow — slow down your drilling. Shanks that are too soft stick in the machine. And, when they are too hard, they cause the piston to spall. This may ruin a drill cylinder. Poor shanks are expensive.

Follow these diagrams for correct shank sizes and temper them in oil.



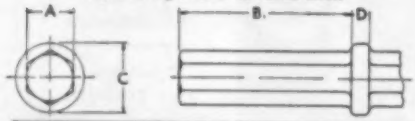
NOMINAL SIZE	A	B	C	D
⅞ HEX. x 3¼	⅞	3¼-3⅜	1⅜	⅜
⅞ Q.O. x 3¼	⅞	3¼-3⅜	1⅜	⅜
1 HEX. x 4¼	1	4¼-4⅜	1½	⅜
1 Q.O. x 4¼	1	4¼-4⅜	1½	⅜

Standard collared shanks for drills.



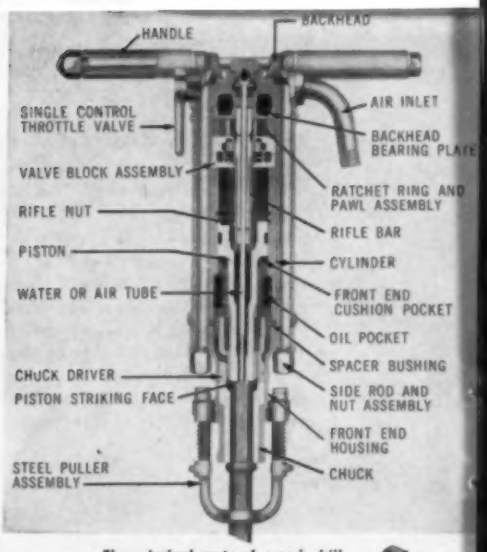
NOMINAL SIZE	A	B	C	D	E
1 LUG	1	3 13/16-3⅞	1½	⅝	1
1⅛ LUG	1⅛	3 13/16-3⅞	1¾	¾	¾
1¼ LUG	1¼	3 13/16-3⅞	1⅞	13/16	¾
1½ LUG	1½	5 -5 1/16	2¼	1	1

Standard lug shanks on round steel.



NOMINAL SIZE	A	B	C	D
1 HEX. x 4¼	1	4¼-4⅜	1½	⅜
1⅛ HEX. x 6	1⅛	6 -6 1/16	1¾	½
1¼ HEX. x 6	1¼	6 -6 1/16	1¾	½

Standard collared shanks for paving breakers.



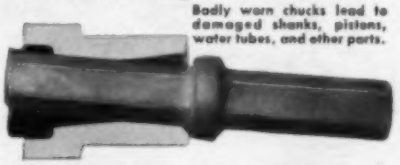
The principal parts of a rock drill.

Keep the striking faces of pistons and shanks square. In time, wear will tend to cup the piston face. When this occurs, the face should be ground until it is flat. Shanks should be square, too, if excessive piston damage is to be avoided.

Correctly faced pistons and shanks stand unsupported.

Don't use worn chucks. A worn chuck allows the drill steel to become misaligned in the machine. As a result, the piston strikes the sharp corners of the drill shank, and you have the cost of a broken piston in addition to the loss of footage.

Badly worn chucks lead to damaged shanks, pistons, water tubes, and other parts.



Use sharp bits. Dull bits bind in the hole and slow down the drilling. They also cause excessive strains on the machine and rapid wear of all rotating parts.

Le Roi-Cleveland one-use CRD detachable bits.

Le Roi-Cleveland developed the "one-use" CRD detachable bit, so that rock-drill operators can use sharp bits all the time at a considerable saving.

* * *

Yes, preventive maintenance pays off. If you'd like to post these tips as a reminder to your drill runners, a supply of reprints will be sent you free of charge. Just write for them.

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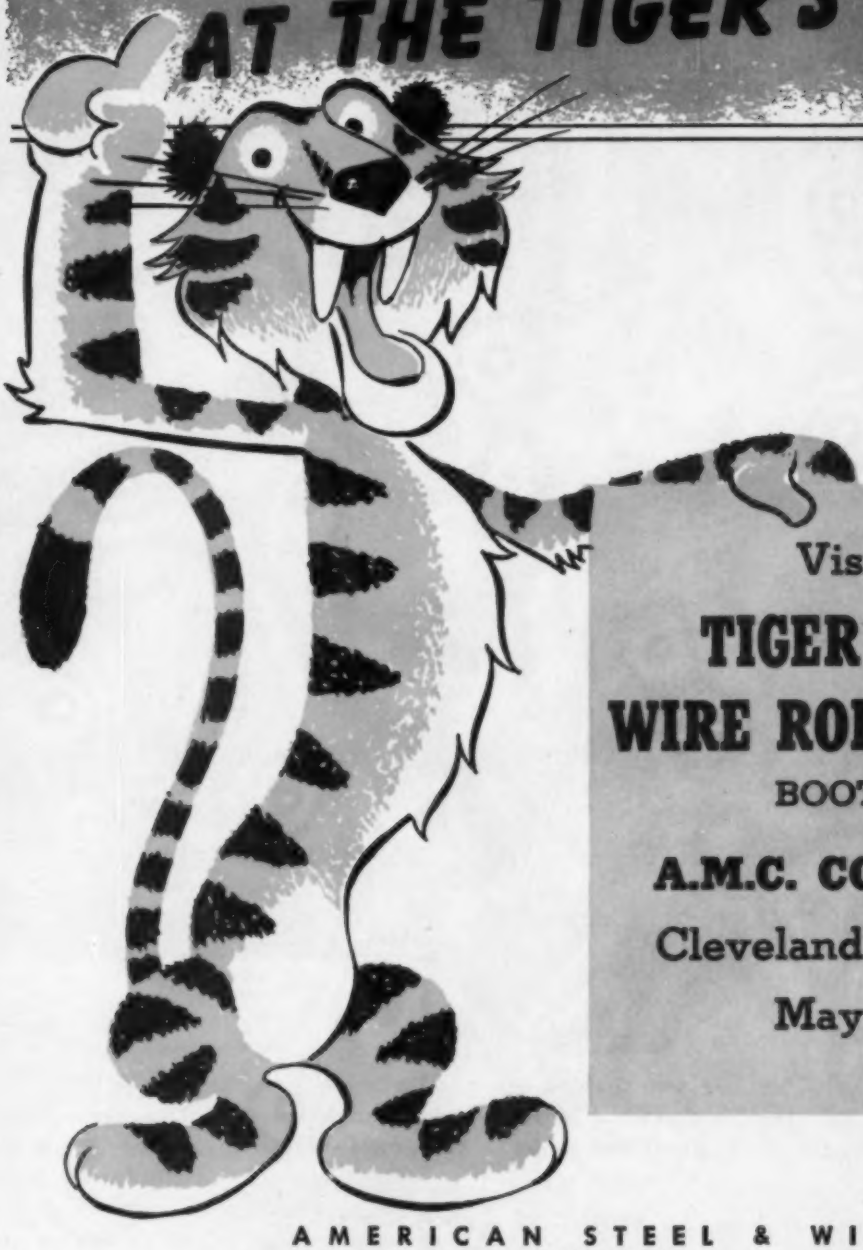

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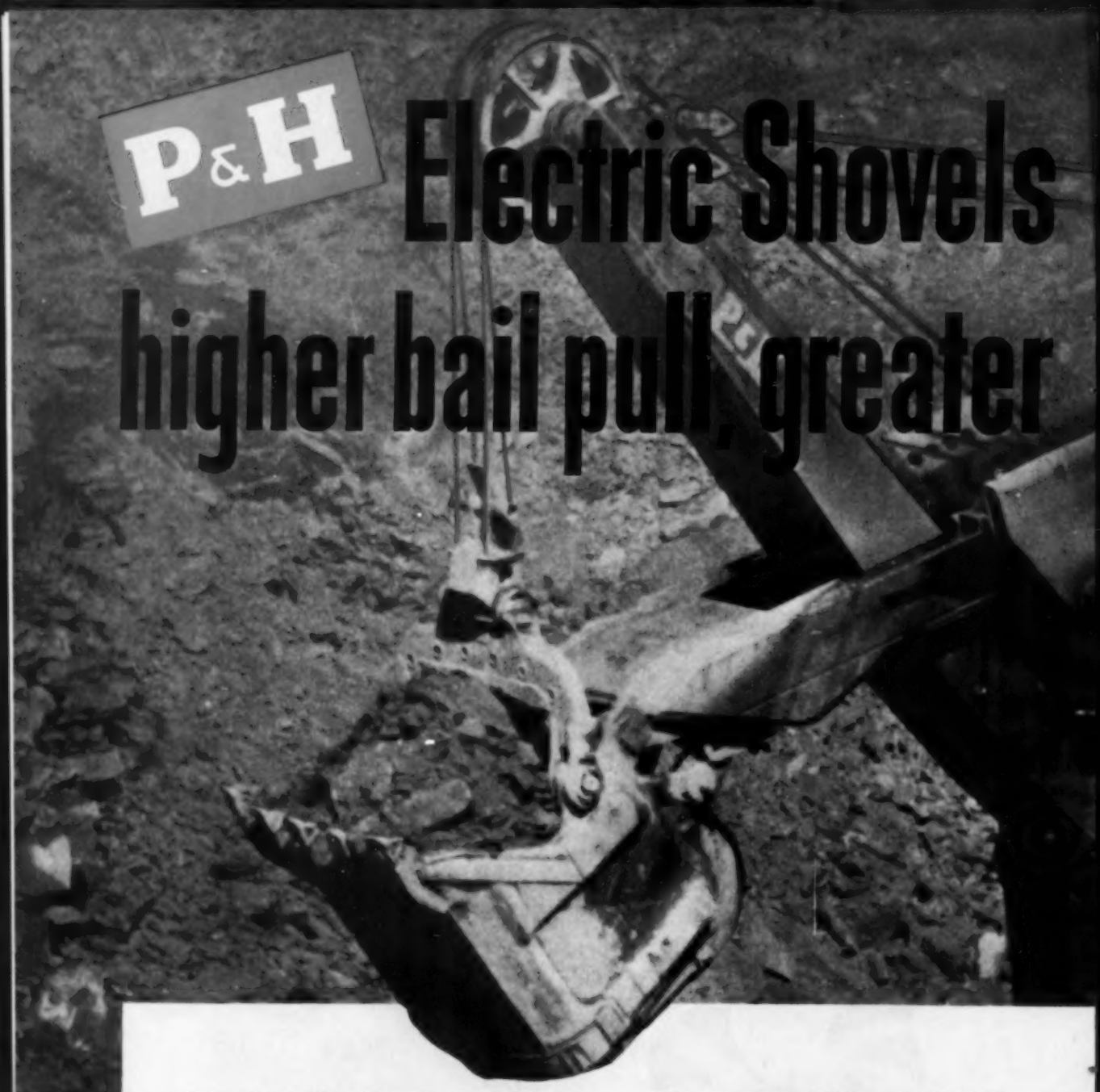

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*T.M. of Harnischfeger Corp. for electro-magnetic type coupling.

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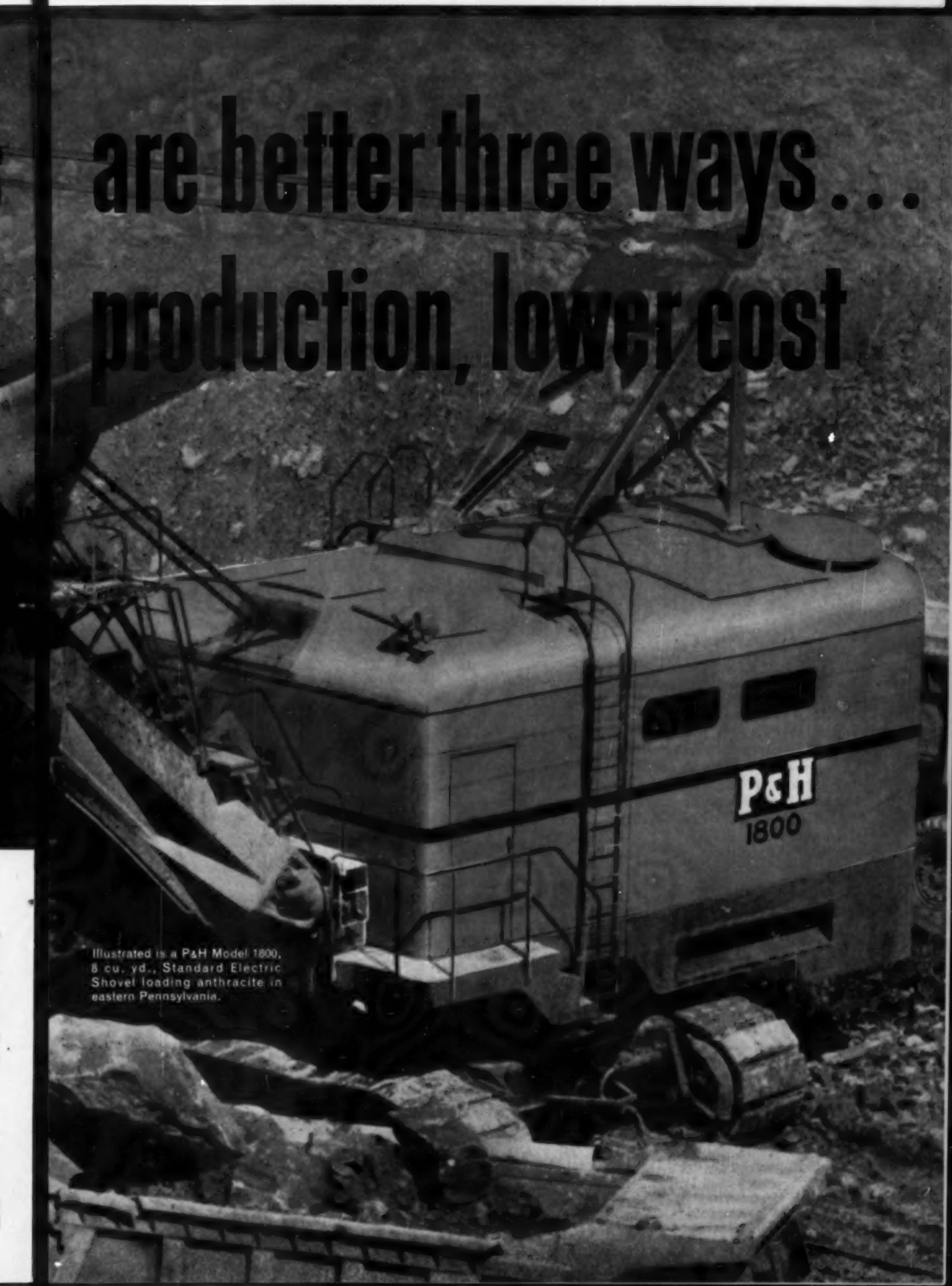

Illustrated is a P&H Model 1800, 8 cu. yd., Standard Electric Shovel loading anthracite in eastern Pennsylvania.

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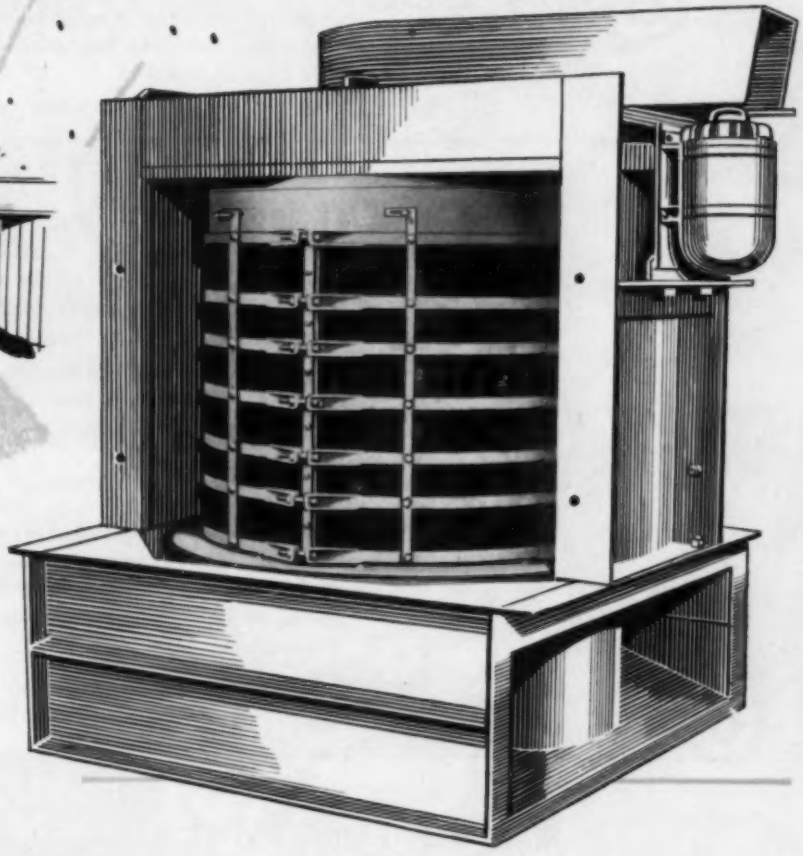

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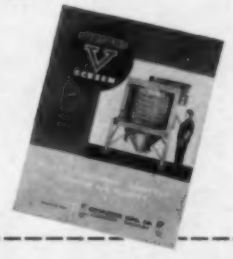

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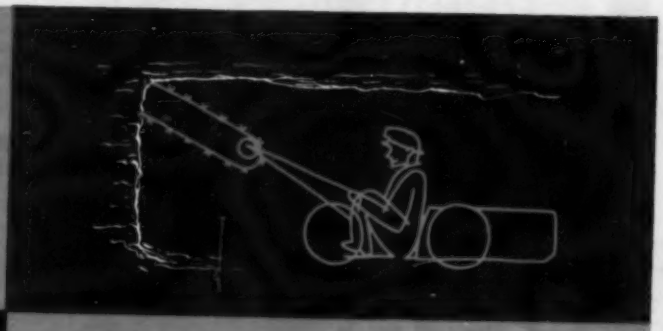

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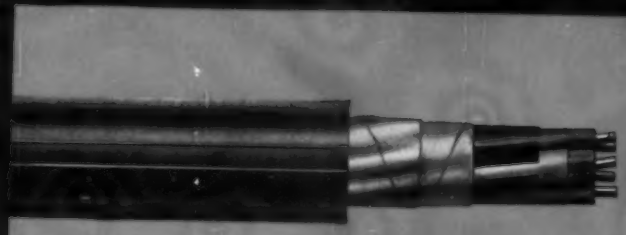

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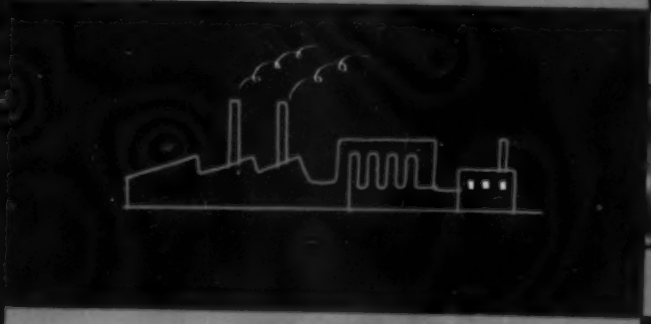
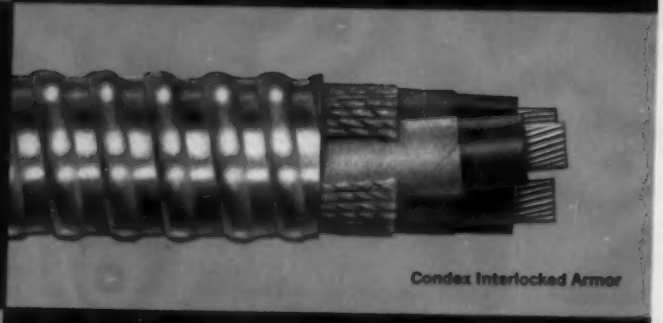
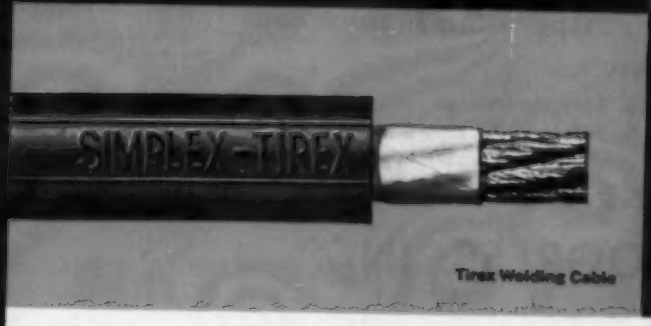




Condex Interlocked Armor



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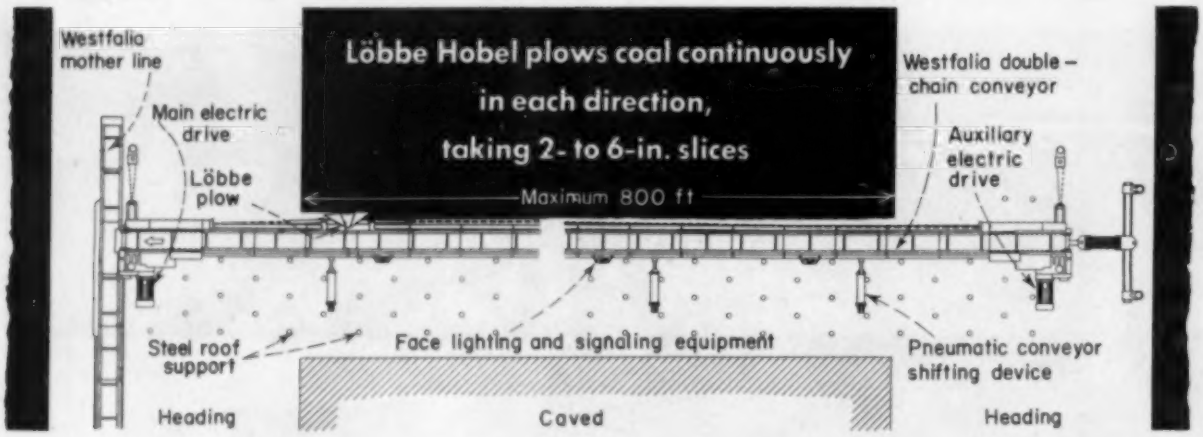

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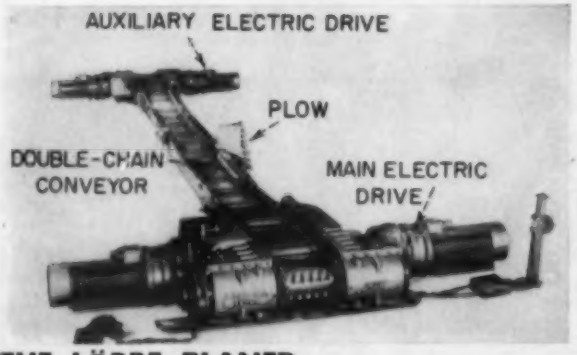

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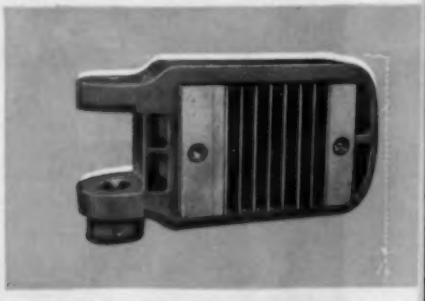
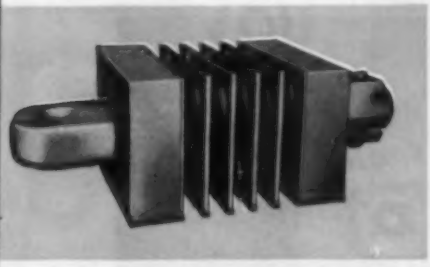


NATIONAL MI-225 Rubber-Cushioned Draft Gear for locomotives and large capacity cars not required to operate through rotary dump. Give maximum impact protection in minimum space.



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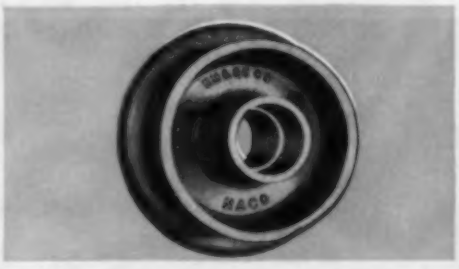

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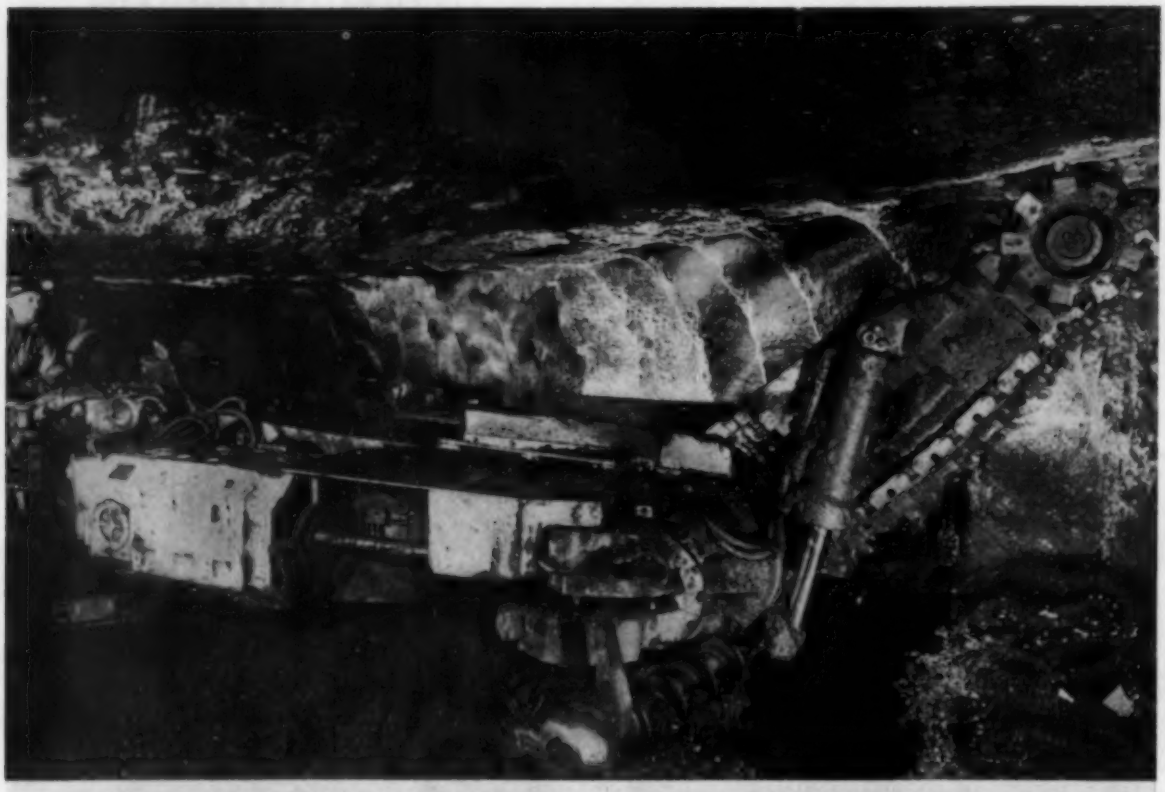
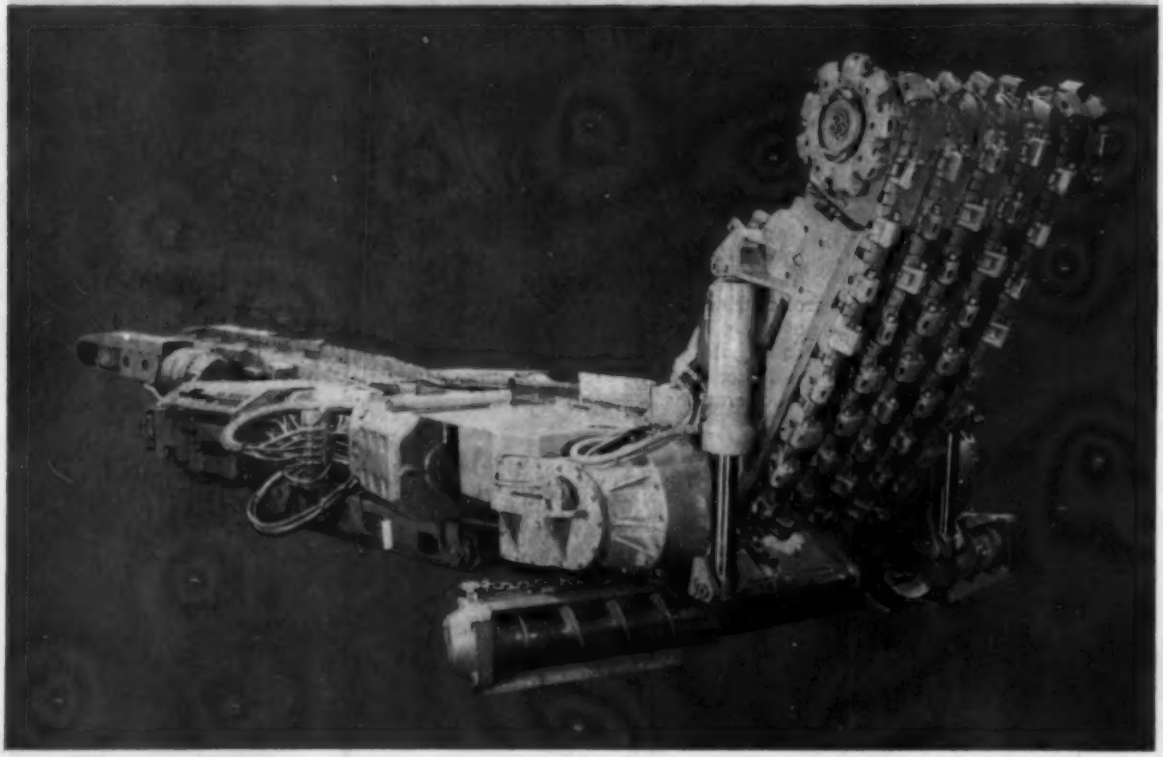


REACHES UP TO 82" FROM FLOOR

The 5-CM gets its long reach from a long 5' ripper head and a deep (24") sumping stroke. Two 100 horsepower motors take care of this heavy work load.

EXTRA-WIDE RIPPER HEAD

A full 42 inches across delivers more coal per cut—fewer cuts per complete face cycle. New direct-acting hydraulic shear jacks and swing jacks supply the "punch."



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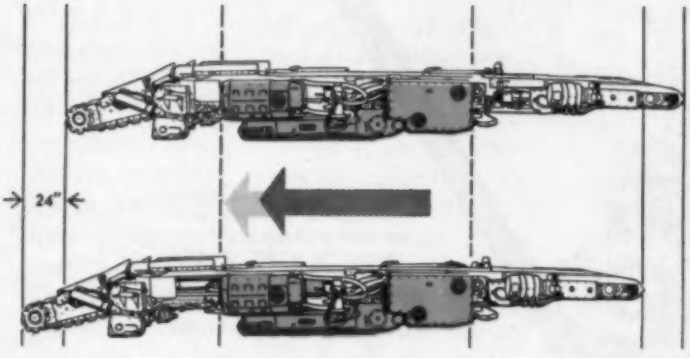
5-CM DELIVERS 4 TO 5 TONS PER MINUTE IN SEAMS AS LOW AS 38 INCHES

Now, even more mines can get the full advantages of continuous mining with the introduction of Joy's new 5-CM. This low (32") Continuous Miner works up to 82" from the floor. It's a close cousin to earlier, time proved Joy miners . . . yet has many new advances that permit a low height machine to deliver such high tonnage.



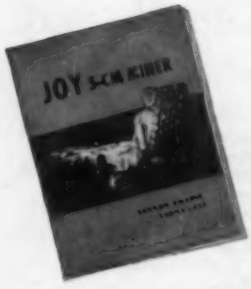
24 INCH SUMP

With every sumping operation the 5-CM enters a full 24 inches into the face . . . delivers extra tons for every operating cycle of the ripper bar as it sweeps across the working face.

CONTINUOUS CONVEYOR

The drawings at left show how the entire ripping and conveying systems of the miner move forward as one unit during sumping. There is no hopper—just one extra-wide (29½") chain conveyor that moves coal swiftly away from the face.

There's lots more—increased power . . . hydraulic tramming—improved clean-up conveyors. Get complete details on this new miner designed to mine 4 to 5 tpm in medium-low seams 38-inches and higher. Write *Joy Manufacturing Company. Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



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DETONATING FUSE

This hole could be one in a thousand, ready to "go" when *you're* ready to go — but not before. It is primed with Primacord, the detonating fuse which is resistant to sparks, friction, ordinary shock, stray electrical currents . . . . Even a direct hit by lightning failed to detonate it!

But a single detonator, attached to the end of the trunk line, will detonate this hole and all other holes in the hook-up. You'll get a blast you'll be proud of!

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Simsbury, Connecticut • Since 1836
Primacord® and Detacord® Detonating Fuse, Safety Fuse, Ignitacord®, Quarrycord, Pyrotechnical Devices and Blasting Accessories.

The square knot is used only above ground, to lengthen a trunk line of Plain or Reinforced Primacord or to tie in Primacord M S Connectors. It must be drawn up tight.

Plain Primacord Trunk Line — Used also for shallow holes — wherever resistance to abrasion and cutting is not required. Textile covered, flexible, resilient, with a "tacky," non-slip surface. Tensile strength 140 lbs. 1000-ft. spool weighs 17 lbs.

Reinforced Primacord Branch Line — recommended for deep holes where normal strength and resistance to abrasion and cutting are needed. Textile reinforced (yellow with red thread), tough, resilient, flexible. Tensile strength 170 lbs. 1000-ft. spool weighs 18 lbs. The knot shown is the double-wrap half hitch, made in the branch line and drawn tightly around the trunk line.

P-3

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

MAY, 1957

IVAN A. GIVEN, EDITOR

No Serendipity

THE QUALITY of serendipity, meaning naturally favored by fortune, is possessed by only the lucky few. The average mortal, which includes the coal man, has to work for his results. Effective work depends upon effective ideas—the more the better. But to use an idea, you have to get it first, and to get it you have to expose yourself as often and as long as possible.

One of the big opportunities for ideas is the American Mining Congress Coal Show, going on again this year in Cleveland, Ohio, May 13-16. The rundown on what the man who attends can expect is provided in the Coal Show preview elsewhere in this issue. Further, *Coal Age* in June will present a digest of all the technical papers and discussion to facilitate the process of acquiring, analyzing and putting ideas to work. If you don't get them you can't use them. Cleveland is one good place to get them—so that they can begin paying off.

Key Factor

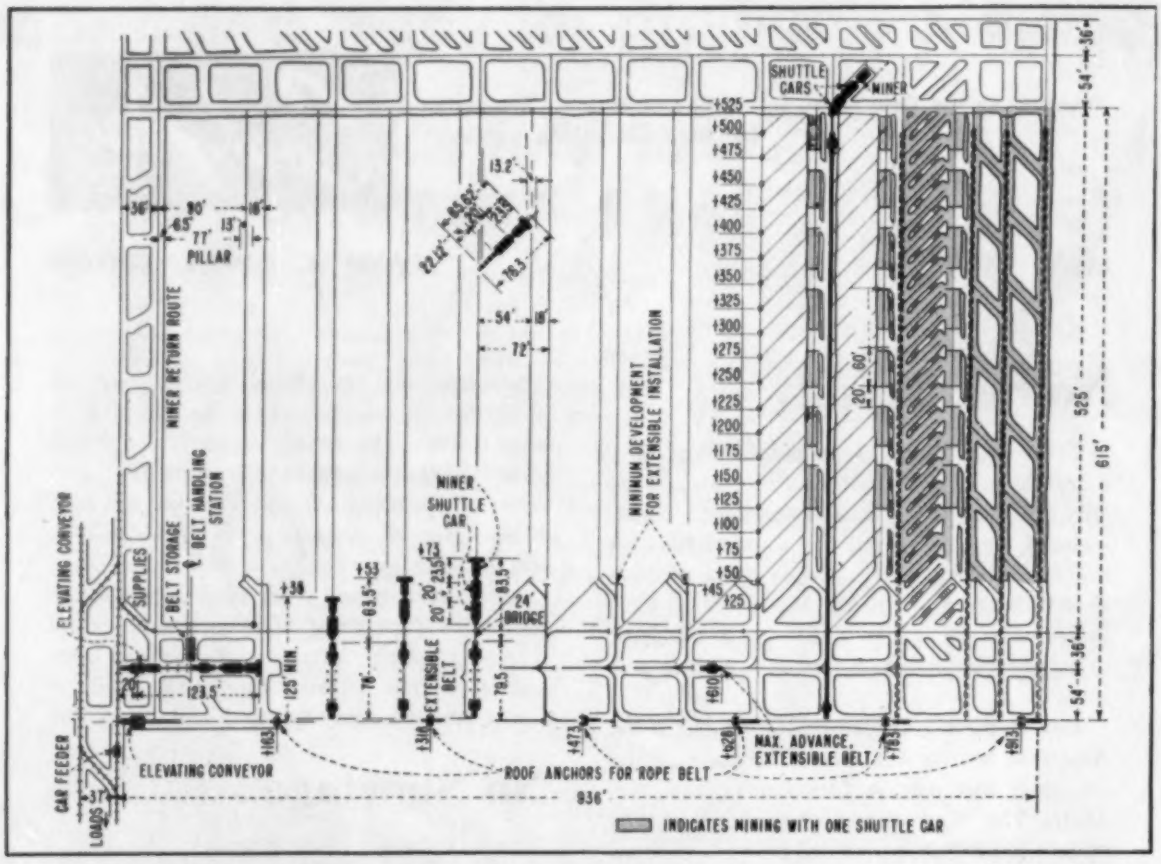
IDEAS—whether for equipment, materials or methods—are put into effect by men. Given men of equal intelligence and experience the one who is most effective in acquiring and using ideas is the one who has had the most training, whether formal or through association with other skilled men or supervisors on the job. This is the fundamental answer to the question of "Why training?"—whatever its type. Another fundamental, as coal is discovering, is that the need for the skills that training can help develop faster and to a higher degree rises with wage rates and investment in equipment.

A quarter of a million dollars can be spent quite easily in equipping a section with modern equipment—and the expenditure will pay off handsomely if the equiment is made to produce as it should. The answer is men who know their business, whether mine workers, supervisors or operating officials. Training can help in attaining the required level of know-how, and growing appreciation of that fact is being reflected in more and more interest in training not only of operating officials and bosses but also of machine operators, maintenance men and other mine workers. The payoff comes in higher efficiency, greater safety and lower cost.

No Shortage

IF WE HAVE THE IDEAS, and we have the men with the necessary training and skills to apply them most effectively, are we going to have any coal to work on? This, it well be recognized, is a largely rhetorical question, but there also is evidence that reserves cannot be counted, as they once were, in thousands of years. But, at the other end of the scale, are we going to be in trouble by the end of the century or earlier, particularly in the area of concentrated population and industry east of the Mississippi?

As its contribution to a final determination of the total, *Coal Age* presents its study of the bituminous reserves picture east of the Mississippi elsewhere in this issue. It shows that the holdings of present organizations are sufficient to meet all possible demands for quite a few years to come, though there may be some shortages in specific types—metallurgical for example, though changing the acceptable sulphur limits can multiply such reserves overnight. And when all other possible reserves east of the Mississippi are added in, it becomes clear that there will be no shortage for another century or more even at double or triple the present rate.



ROOM PANEL PLAN for miner and rope belt includes pairs of rooms on close centers with wide solid pillar between pairs. Two shuttle cars and bridge conveyor permit miner to angle through wide pillar at 25-ft intervals.

Preparing for Continuous Mining

Planning a new property for continuous mining? Converting from conventional to continuous operation? . . . Here is an 8-page roundup of elements which must be considered to make either plan most effective.

WHAT'S INVOLVED in setting up for continuous mining? What are the special problems that might come up in roof support, power, ventilation, transportation and other supporting activities?

These are several of the questions that an operator must find the answers to when he goes to continuous mining. To get these answers and thereby avoid pitfalls in setting up a program, potential continuous-mining operators must check each property individually.

Here is one way you can go about the job.

What Type of Machine?

Since mining conditions vary from place to place within a coal seam and frequently within a mine, the selection of a machine is basically governed by the seam conditions in a specific area. Therefore, the first order of business is to look at the coal itself. To be applied successfully, a continuous miner must be able to remove coal from the face at a faster rate than with conventional methods or with fewer men. But it is not enough simply to be able to produce coal at a satisfactory rate. The machine must be able to break the coal free with a minimum of wear and tear on the unit and without too high a bit cost. Down time throughout the shift and maintenance cost can offset the advantage of continuous miners.

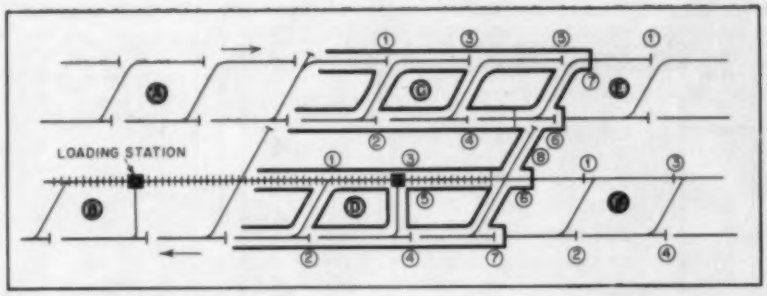
Rock partings or inclusions, if present in the coal, can affect the choice of the type of a continuous miner—for example, the location, thickness and hardness of a parting are factors to be considered. A ripper-type machine might be able to mine a seam with a rock parting near the top but perform less efficiently when the impurity is near the bottom. On

the other hand, a boring-type miner might bite into a seam with a rock parting but mine at a slower rate where sulphur balls are present. Some indication of whether a continuous miner will be able to operate satisfactorily in a hard coal or one with impurities can be obtained by checking the difficulty of cutting, drilling and shooting the seam in a conventional setup.

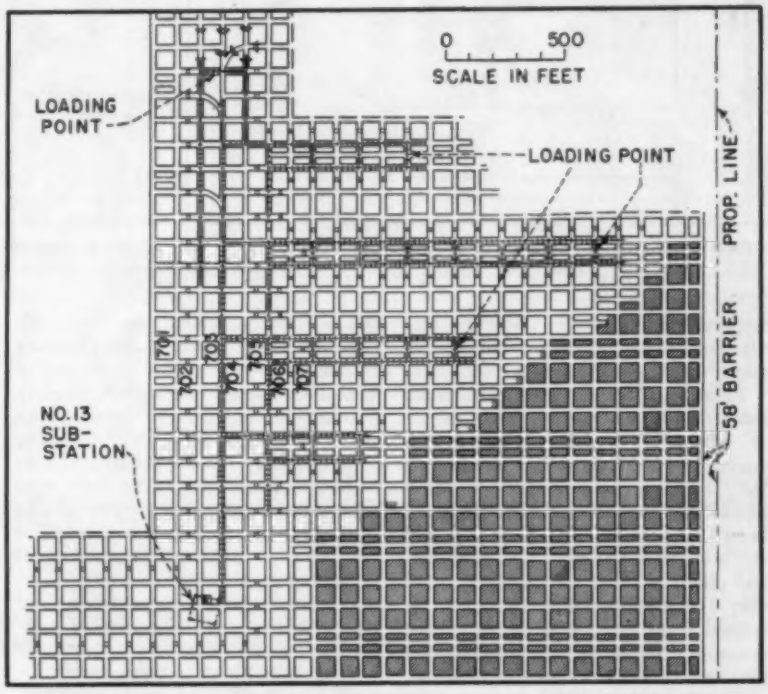
The thickness and pitch of the coal bed are other important points to consider in choosing a continuous miner. If the coal thickness varies greatly, or thins out, a machine that can mine a varying thickness of coal usually gets the nod.

Two other important factors to consider are the strength of the roof and the type of floor. If the roof and the floor are both strong, all types of machines will work effectively, other conditions being favorable. But if the roof is weak you should try to determine how much time will be lost, if any, while timbers are set or bolts installed. If the floor is soft it might be advantageous to select the machine that would permit the operator to leave a coal floor with a minimum of operating precaution.

Before making a decision on the type of machine for a specific mine, clearances in existing openings should be remeasured and checked against machine dimensions. Overall dimensions of a continuous miner do not necessarily control the size of opening through which it can be moved. For example, machines have been disassembled at the top of a shaft and lowered piece by piece. They then were reassembled either at the foot of the shaft or hauled to an assembly area near the face. The choice of where such reassembly is done may be controlled by the underground clearances.



PLAN DEVELOPMENT SEQUENCE to get maximum operating time and minimum moves for mining machine. Letters and numbers show sequence.



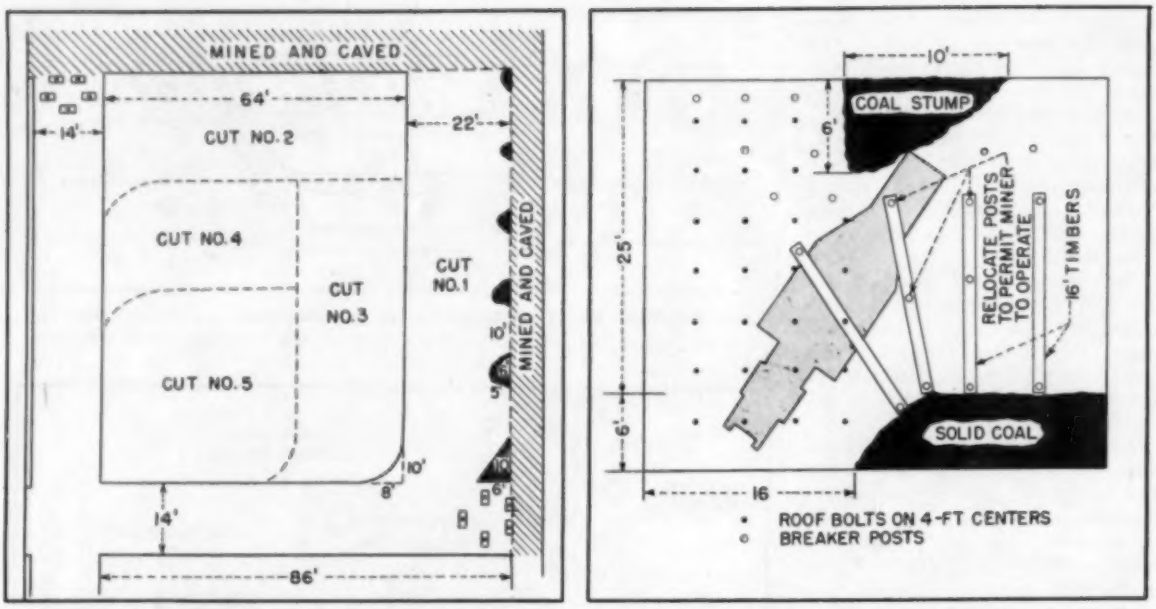
PANEL LAYOUT for track haulage system may include loops with loading stations in split blocks for faster shuttle-car unloading.

Developing a Mining System

Once the type of machine is selected, focus your attention on developing a mining system. Because a continuous mining machine stays in one place for a full shift or more some new problems are introduced. The most important of these is roof control. In some mines a machine can drive 100 ft or more without support. In others, either roof bolts or timbers must be set as soon as possible. Thus with poor roof conditions more places might be needed than with good roof because the machine might have to move to a new place while timbers or roof bolts are set.

There also are various government regulations regarding continuous miner methods that should be checked before laying out a mining system. You should check your state mining laws for specific regulations on such items as roof bolting and the use of auxiliary fans. What they say about these may influence the number, width and centers of working places.

The distance between openings in development work is influenced more by the depth of cover than by the type of machine. Most companies alter heading centers little or none when changing over to a continuous mining system. But sometimes a number of headings in main entries can be driven with a minimum number of breakthroughs between sets of intakes and returns. For example, in an eight-heading entry, where the two outside headings on each side will be returns, headings can be driven in pairs with one or two continuous miners. One of the two headings can serve as an intake and the other as a return at this stage of development. The four headings in the center also can be driven in pairs and all four connected with breakthroughs. These four center headings do not have to be joined to each set of outside headings until a haulway across all headings is needed for a new loading point. When the loading point is moved up, it will require only two permanent stoppings in the previous haulway to establish the



OPEN-END PILLARING results in maximum recovery. Size of block may be designed to permit full recovery of a block in a specified number of shifts, and shape should be designed for maximum miner efficiency.

final ventilation system. The four middle headings can then serve as intakes with two returns on each side.

Pillaring methods with continuous miners have undergone some changes as companies become more experienced in their use. This is particularly true where new transportation units like the extensible belt have been introduced. Many companies still stick with the old standard room-and-pillar or block system. But some very worthwhile benefits can be reaped from using new systems. For example, rooms can be driven 600 to 1,000 ft deep. Where such a layout is possible, significant savings in development cost can be made. The dimensions in many cases will be determined by the type of transportation system employed.

Experience indicates that best results are obtained when pillars are extracted one at a time and one, or at most two, machines are worked in a panel. The method of mining often is set up similarly to a conventional system because the machine operators and supervisors are familiar with it. And good results frequently are obtained with this setup. But it is always wise to check all the variations of mine layout for new opportunities to improve equipment performance or increase coal recovery. For example, experience of various companies shows that a flat pillar line works exceptionally well in continuous mining. Many companies also have been able to boost coal recovery by adopting open-end pillaring methods where roof conditions previously permitted only splitting. Since mining is concentrated in one place and a complete pillar is removed before another is started, roof usually can be controlled easier.

It is usually easier to mine a square or oblong block and at the same time recover a greater percentage of the coal. A machine operator can guide the machine into the pillar at right angles and prevent formation of irregularly shaped stumps. This consists of taking successive lifts, or splitting a large block and recovering the smaller by cutting at right angles.

A combination of roof conditions and the difficulty of making a 90-deg turn with some continuous miners led some companies to develop systems with angle or diamond blocks. There are several methods of recovering these blocks. The simplest is to take slices or lifts on the same angle as the breakthrough and recover the final stump by splitting from the outby breakthrough.

Another method that can be used under weak roof involves leaving stumps or wings along the gob side while a cut is made through the pillar. The smaller blocks then are recovered by splitting.

The choice of a pillaring system should be made only after a careful study of the roof and seam conditions, type of machine and skill of the operator. Any one of these can control the mining layout.

Equipment moves should be given careful consideration in mine design. For example, pillar dimensions can be selected so that a complete pillar can be removed in a definite number of shifts. One company provides blocks that can be extracted in two shifts. Thus no small stumps are left standing over weekends or vacation periods. With this system, equipment attacks a new block at the start of each day shift and completely removes it during the second shift. If mining is to be done on a triple-shift basis, pillar dimensions can be adjusted accordingly to provide coal for all three shifts.

Roof Support Affects Production

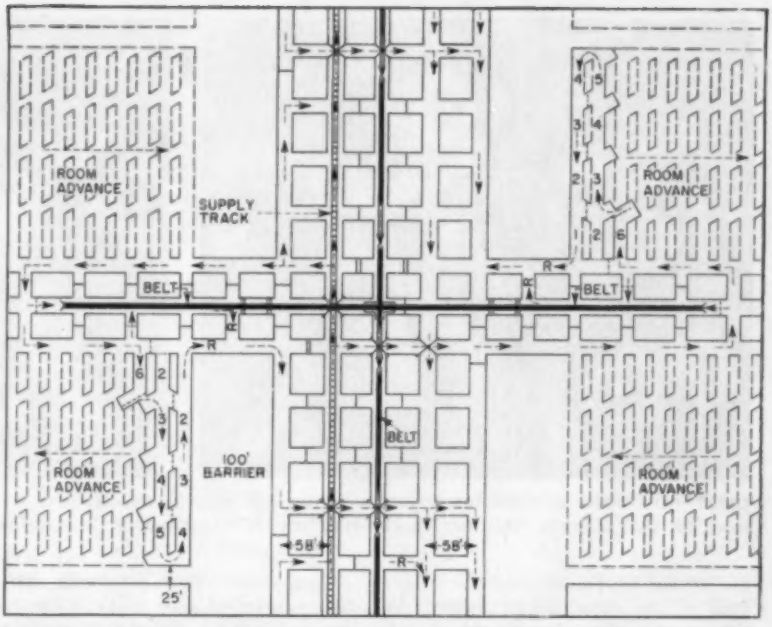
The degree of success of a continuous mining program depends to a large extent on how much of the time is spent producing coal. Because a continuous miner sometimes stays in one place for an entire shift, providing roof support without hindering production is a problem. There are two choices as to when roof support should be installed: either (1) as the machine mines coal or (2) after it has been trammed back after advancing a predetermined distance. The latter involves stopping production and therefore getting less than top capacity from the machine. Since each move out of a working place cuts into production time, roof support methods should be designed to be carried out in cycle with mining.

This is not always possible because of the differences in the various machines. For example, it is sometimes difficult to install any type of roof support while a machine is advancing on a full face. If a machine takes the full width in two or more passes there is a greater opportunity to set timbers or install roof bolts as the machine advances. Regardless of the system of mining coal and supporting the roof, the key to successful control is having supplies and equipment always near the face so support can be installed in a minimum of time and with as little interference with mining as possible.

Here are some examples of mine-tested methods of providing roof support under various conditions. An Indiana company using a boring-type machine drives headings 18 ft wide in two lifts. After the continuous miner bores ahead 25 ft on one side it moves back and advances 50 ft on the other. The first 25 ft of the opening is supported temporarily by wooden props or steel jacks set on not more than 6-ft centers as soon as the machine pulls back for the second cut. When the 50-ft advance is completed, the machine is trammed to another heading. As soon as the miner leaves the place, expansion-type bolts are set on 4-ft centers. At a Pennsylvania mine using a similar boring machine, roof bolts are installed after each 20-ft advance along each side. Safety jacks, set as the machine pulls back from the face, protect the bolting crew.

Another Pennsylvania mine uses a trepanning miner to drive headings 18½ ft wide in two lifts. Lifts are staggered in 8-ft steps and a wooden crossbar is set as soon as the miner gets even with the previous cut on the opposite side.

At a West Virginia mine employing a ripper-type miner, roof bolts are installed as coal is mined. Two rotary hydraulic bolting drills mounted on opposite sides of the machine are used to set bolts according to a definite pattern as the machine produces coal.



EFFECTIVE VENTILATION for continuous mining involves delivering greater volumes at controlled velocities to working faces to dilute increased methane emissions, control dust and dissipate heat.

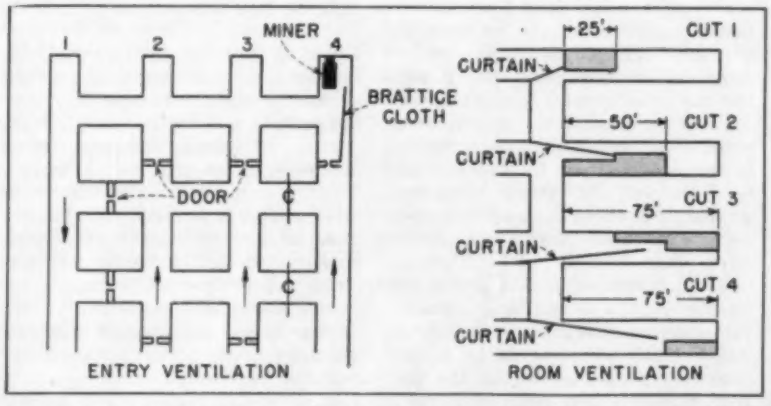
Ventilation Becomes More Important

Continuous mining requires that more attention be paid to ventilation for several reasons. More dust is generated in the mining process than with conventional batch methods and the machine stays in one place longer. As a result the dust does not have as much time to settle or to be diluted. Methane also is frequently liberated more rapidly in continuous mining areas. To reduce the dust and gas hazards, large volumes of fresh air must be coursed to the faces. The problem of providing adequate ventilation is one of the most difficult in continuous mining.

One Pennsylvania company learned that a carefully installed line curtain will direct adequate air for a distance of about 100 ft. Beyond this point the volume reaching the face dropped rapidly. The company improved face ventilation by installing an auxiliary 3-ft exhaust fan. This unit provided more air, improved visibility and permitted easier cleanup in entries. It is a closely controlled setup governed by stringent rules.

An Alabama company keeps the dust count as low as possible by directing spray water to the source of dust formation and by passing the greatest possible quantity of air through any remaining suspended dust to dilute the concentration as much as possible.

The company learned by experience that best results are obtained by limiting the flow through the last breakthrough to 15,000 cfm. More caused worker discomfort and tended to pick up dust. Lower volumes did not carry the dust away satisfactor-



FACE VENTILATION in gassy mines demands strict line-curtain discipline to conduct fresh air right up to the cutting elements of the miner.

DUST CONTROL is more important in continuous mining. Special pumps (left) can provide spray water to cutting head for dust-allaying, and wet rockdusting (right) can be done in-cycle to keep pace with rapid miner advances.

ily. Intake air passes over the members of the crew before flowing to the face and line curtains are always kept 4 ft ahead of the operator.

Since a continuous miner advances very rapidly and works in a minimum number of places, more attention must be given to face ventilation problems. For example, line curtains frequently are installed hurriedly and there is ensuing high leakage. Because irregular places in the roof take more time to be sealed, they frequently are neglectd. If shuttle car haulage is used in the section, curtains across the routes are subject to much wear and tear and are difficult to maintain. Repair and maintenance of line curtains can interfere with the normal duties of production men and therefore should be assigned to specific men as part of their regular work.

Good face ventilation will carry most suspended dust away from the face but special attention should be given to the return aircourses to see that they are adequately rockdusted at all times. By carrying out an effective dust allaying program at the face, the dust problem can be eased considerably because dust is prevented from being thrown into suspension.

Water delivered to the face at high pressure and discharged as a fine spray usually will do the best job of allaying dust. A wetting agent added to the water will improve the effectiveness of the water and thereby reduce the quantity required. To provide clean, nonacid water to the spray system, some companies pipe it in from the surface. In some instances city water is used in dust-allaying.

Power for Continuous Mining

The primary job of the power circuit is to deliver energy to the equipment at the proper voltage. This job is becoming more important as more and more horsepower is being packed into continuous miners and auxiliary face equipment. Since there is little or no diversity factor, because machines are working practically all the time, substation capacity must be figured more carefully than with conventional units. Because all production capacity is concentrated in one machine, the unit should be supplied with good voltage to permit maximum performance and eliminate electrical breakdowns.

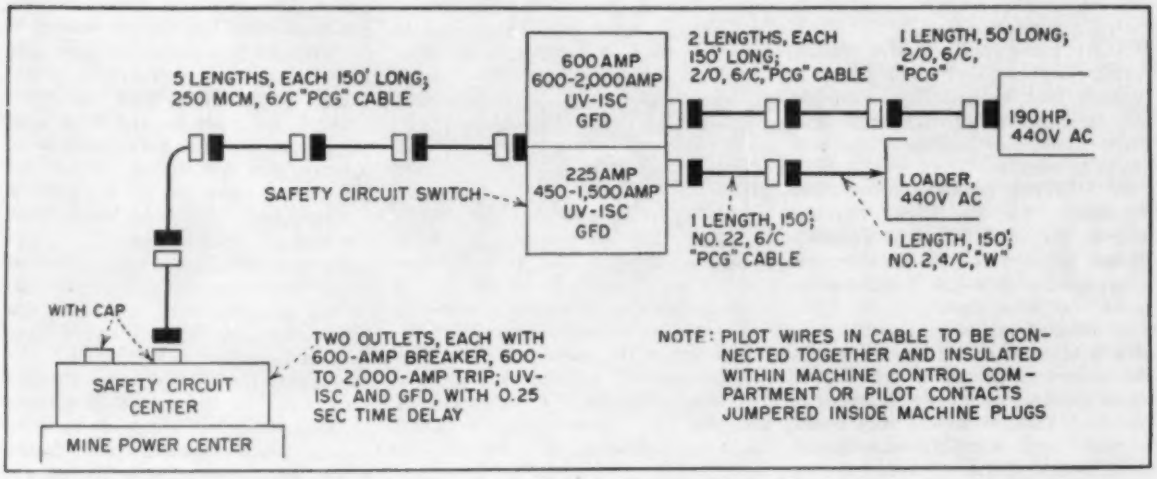
Both DC and AC power have been used successfully with continuous miners. If continuous machines are added to a mine using DC conventional equipment it may be desirable to stick with DC power to avoid a large capital investment. But if substation capacity and power circuits already are loaded to capacity it is worthwhile to study the possibilities of using AC power. If boreholes are used to carry AC power to underground substations it is not too difficult to carry AC power to a continuous miner.

The advantages of AC power are worthwhile and should be given careful attention. Results of a study of AC and DC power made by an Indiana company showed that the first cost of 440 v AC equipment on a continuous miner was 9.8% less than on a DC unit, and that the cost of a 300-kva transformer was 69% lower than a 300-kw rectifier. Cable cost also was 50% lower because higher voltage can be transmitted by smaller wires. A cable one-half the size and weight needed for a DC machine was ample for the AC unit. Smaller cables also can be handled easier. Motor cost averages two-fifths the cost of DC motors and maintenance is easier.

The problem of maintaining good face voltage is simplified since portable transformers can be easily and quickly moved and reset. For example, a portable 300-kva dry-type nitrogen-filled transformer 3 ft high, 5 ft wide and 10 ft long weighs only 7,000 lb. Another advantage of this type of transformer is greater safety because the unit is hermetically sealed against dust, dampness and explosive gases.

Primary AC power is transmitted underground at values from 2,300 to 7,200 v. Secondary voltage is either 220 or 440 v, with the latter gaining in favor. One Kentucky mine has 480 v at the secondary terminal to assure 440 v at the face equipment. Cable lengths are maintained at specific lengths so equipment must be moved before voltage drop becomes critical.

Poor DC voltage can cause failure of power cables and electric motors. When a cable fails in a continuous mine section it is much more serious than in a conventional one. Aside from the danger of causing cable or motor failure, low DC voltage slows motors down in proportion to the voltage drop. As a result machines are sluggish and output is correspondingly reduced. Low DC voltage is caused by any one of the following: transmission distance from the substation is too long; excessive cable


5 LENGTHS, EACH 150' LONG; 250 MCM, 6/C "PCG" CABLE
600 AMP 600-2,000 AMP UV-ISC GFD
225 AMP 450-1,500 AMP UV-ISC GFD
SAFETY CIRCUIT SWITCH
2 LENGTHS, EACH 150' LONG; 2/0, 6/C, "PCG" CABLE
1 LENGTH, 50' LONG; 2/0, 6/C, "PCG"
190 HP, 440V AC
LOADER, 440V AC
1 LENGTH, 150'; NO. 22, 6/C "PCG" CABLE
1 LENGTH, 150'; NO. 2, 4/C, "W"
WITH CAP
SAFETY CIRCUIT CENTER
MINE POWER CENTER
TWO OUTLETS, EACH WITH 600-AMP BREAKER, 600- TO 2,000-AMP TRIP; UV-ISC AND GFD, WITH 0.25 SEC TIME DELAY
NOTE: PILOT WIRES IN CABLE TO BE CONNECTED TOGETHER AND INSULATED WITHIN MACHINE CONTROL COMPARTMENT OR PILOT CONTACTS JUMPERED INSIDE MACHINE PLUGS

APPLICATION OF AC POWER is worth serious consideration in preparing for continuous mining. Safety, economy and easier maintenance are benefits.

length: undersize feeder and return; or undersize trailing cable.

For maximum performance, motors should operate at rated voltage, with this value delivered to the nips. To provide 800 amp at 250 v DC with a 50-v drop at 3,250 ft, equivalent copper conductor should be 1,050,000 cir mil. At 4,000 ft, size required would be 1,440,000 cir mil at an increased cost of about $15,000. Even with the maximum in feeder capacity it is difficult to maintain adequate voltage for 250-v DC equipment at distances for much over 4,000 ft.

The maximum distance DC can be transmitted from the substation depends on a number of factors, and must be calculated for each operation. Balancing everything, the distance should not exceed 3,000 to 3,250 ft for an 800-amp average transmission, 300 v at nips and 250 v at face.

Higher horsepower per machine and per section is requiring an increase in the capacity of rectifiers and other conversion equipment. A recent study indicates that the capacity for a single continuous-miner section should be at least 200 kw.

Transporting "Continuous" Coal

One of the early major problems in continuous mining was that of getting the coal away from the machine. The big advantages of concentrating production in fewer working places or in a single place were diluted by the difficulty of removing the output under such restrictions. The problem of face transportation was immediately recognized as a critical one.

First solutions involved the use of existing equipment in new arrangements (surge car, pickup loader), then the development and refinement of new concepts in transportation (extensible and rope-belt conveyors with bridge conveyors).

This does not mean, however, that the original ways of getting the job done have been entirely superseded by the newer ones. Under the right conditions, a pickup loader still is a formidable competitor of all other methods. True, an operator and second machine must be kept at the face, but when the problem is one of converting from conventional to continuous methods the only required investment, initially, is in the continuous machine. But the pickup loader should operate on good bottom, otherwise another chance of loading out impurities with the coal is introduced into the cycle. Furthermore, continuous machines and new transportation media create new opportunities for redesigning mining systems, and for this reason the days of the pickup loader, except in special circumstances, may be numbered.

Among the more promising of the new projections are those leading to the use of longer rooms, up to 900 ft or more. Such planning has been made possible through the development of extensible conveyors, which provide alternatives such as (1) keeping the haulage distance of shuttle cars within acceptable limits if cars are used, or (2) permitting a direct link to the continuous-mining machine through the medium of a bridge conveyor. In either case, longer rooms become feasible, thus reducing the amount of development work required to provide room panels.

An added starter among conveyors for continuous mining is the one employing special cornering devices which permit 90-deg turns in the belt line. One such conveyor has successfully operated around two right-angle turns in a Pennsylvania mine. In preparing for continuous mining, each of these possibilities should be carefully weighed. Their advantages and limitations under prevailing mine conditions should be carefully assessed before any attempt is made to select face-transportation equipment.

Factors affecting selection include height of the seam, character of the bottom, maximum possible width of openings, roof-support requirements, existing power facilities and so on. All these must be considered in deciding upon a face-haulage system.

Intermediate haulage—that is, from room neck to main line—may need study and improvement if the full productive potential of continuous mining is to be realized. Whether the system includes mine cars and track or belt conveyors or a combination of the two, there are steps that can be taken to insure highest-possible capacity and continuity of operation. Among these are:

1. A "loop" track may be installed to eliminate car-change delays in feeding empty cars to the loading point. If the loading point is a panel belt-to-mine car setup, a boom man may be required, but the use of a car-spotter or robot locomotive may permit section haulage to be handled by a locomotive operator alone.

2. It is possible to fully automate a belt-to-mine car loading point by the use of a car-spotter controlled by limit switches, floats for sensing coal height and probes for control of the trip. These can be made at the mine

or purchased as complete units from certain manufacturers.

3. At belt-to-belt transfer points, paddle switches and other sequence controls, such as centrifugal switches, can be used to provide fully-automatic transfer of coal from one conveyor to another.

4. At shuttle car-to-mine car transfer points, the shuttle-car operator may be provided with a push-button station from which he can operate a car-spotter or robot locomotive to move the mine cars.

Starting afresh at a new mine, the choice of track or belt conveyors for the main haulage system will depend upon grades, distances, alignment of openings and so on. In any event, capacity and continuity can be assured through proper planning. Heavy steel on a good roadbed makes it possible to haul large cars at relatively high speeds, provided good communications and haulage-control systems also are installed. And a track-haulage system always provides some surge capacity in the empty cars available for loading.

Belt-conveyor systems for main haulage also are amenable to fully automatic control, and if surge capacity is an element to be desired, it can be had by providing a raw-coal stockpile on the surface receiving the discharge of the portal conveyor. This surge capacity, in mine cars or in a raw-coal stockpile, is a hedge against having face operations interrupted as a result of delays in the plant.

Manpower for Continuous Mining

The matter of optimum crew size forces the trite statement that a face crew for continuous mining should be as small as possible but big enough to get the work done. In this regard, continuous mining is just like conventional mining, in that extra men on the crew adversely affect productivity in tons per man-shift while too few men adversely affect production in tons per unit shift. In conventional mining this may have been a matter for adjustment over a period of time, but in continuous mining the matter of crew size is critical to start.

In preparing for continuous mining, therefore, some provision should be made for an industrial-engineering analysis of the entire project. This includes more than time-and-method studies after the machines are in operation. A survey of current literature should be conducted before the machines arrive to determine what others have done and are doing under similar natural conditions.

Tentative job standards and job descriptions should be worked out with due regard for the special requirements of continuous mining. For example, one man may be needed for the single duty of keeping line curtains properly installed. In conventional mining the regular members of the face crew usually can take care of this work, but continuous mining raises special problems in ventilation and dust control, as explained earlier in this article. The upshot is that while conversion to continuous mining will reduce total manpower needs, it also demands a complete review of existing job descriptions.

A parallel study is that of calculating how much of an investment can be made in mechanical equipment to keep crew size to a minimum. Assuming that capital for buying equipment is available or can be secured, it should be noted at the beginning that one job in a year of 220 working days requires a cash outlay of about $5,500, exclusive of fringes. Double this for a two-shift operation. Thus the apparently-high first cost of a machine that can be operated by one man may be more of a bargain than an inexpensive unit requiring two men. Such a decision cannot be made of course on the black-or-white question of first cost alone. Shades of gray, including maintenance costs and parts replacement over the life of the machine must be studied.

Proper training for face producers and maintenance men is more important than ever. Continuous mining is the ultimate in concentration, making it mandatory that operators be highly skilled in handling their machines. There is not room for any other kind of operator. Providing training is management's responsibility. Otherwise the men will be forced to "muddle through" until time alone brings some measure of proficiency.

Prospective operators may be sent to manufacturing plants for orientation in the characteristics and operation of the machines they will use, or they may be permitted to familiarize themselves with the machines under power on the surface before they are taken underground. The follow-up to these possibilities is close supervision in the early period of underground use.

Adequate training for maintenance men is of equal importance. One company has decided that the time has come to conduct a company school for all mine mechanics and electricians to make certain they have the information and skills they need to service today's complex machines.

Safety training is a must if the full benefits of all this technology are to be realized. New methods and equipment can introduce new hazards, and extra safety effort will be required to foresee the hazards and remedies.

In addition to training programs for workmen, conferences and courses for supervisors also are more common, which is recognition of the fact that maintaining the pace of continuous mining requires sharper supervision by competent crew leaders.

Supply Accounting and Distribution

Strict control is the key to good maintenance for continuous mining. Such control can be had by initiating a program that includes the following four elements:

1. Assemble complete data on all equipment units. This includes location, function, nameplate data and so on.

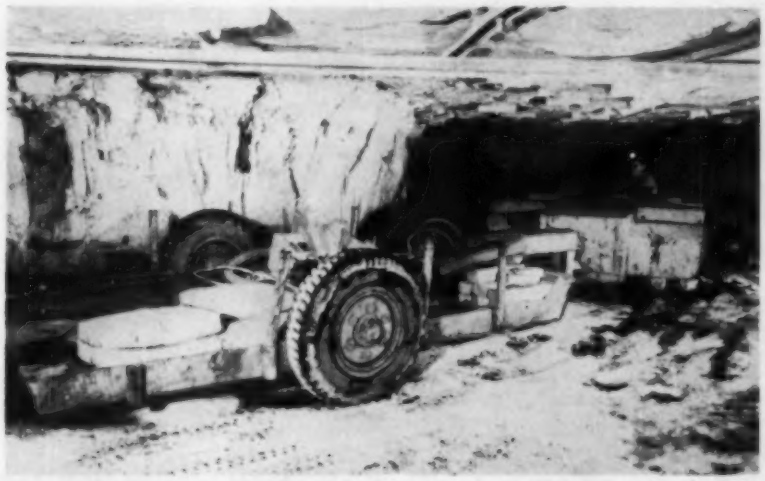
2. Determine the degree of maintenance each unit should have. Expensive units should have scheduled maintenance checks. Others might be cheaper to replace than to maintain. Evaluate all equipment with these points in mind.

3. Set up a routine for maintaining the equipment. The routine should specify the frequency of inspection, the services to be performed and the records which should be completed.

4. Determine which machines are critical to the operation and make special provisions for their care. The continuous-mining machine itself is critical, but so is the car-spotter if your setup includes one. In rating for critical values give special weight to the effect an outage of the machine will have on production.

Planned overhauling of major machines is a practical necessity. The work can be done at the mine shop or in the shops of outside rebuilders. In either case, the work should be done on a planned basis, and this requires a prescribed system of keeping records on cumulative tonnage handled by the unit, history of breakdown and repair, cost of replacement parts and so on. Such a record may indicate that for a certain machine the overhaul date should be advanced, or it may indicate that overhauling might be postponed, either decision being based on facts.

Organizing for better maintenance is an important element in preparing for continuous mining. In view of the rapid pace of the operations and the



SUPPLY DISTRIBUTION in working sections by battery-powered tractor-trailer units provides flexibility without interfering with cycle.

influence of good maintenance on high production, steps must be taken to insure proper prestige for the maintenance department. The head of the department should report directly to the chief of operations on equal terms with top production supervisors.

In staffing the maintenance department, the need for new skills must be recognized. Competent technicians in hydraulics, electricity and mechanical repair and adjustment are essential to follow through on special problems that cannot be handled by unit mechanics. This is an echelon setup in which skills and facilities become more specialized as the maintenance organization is built up.

Planning for Maintenance

The echelon approach can be extended to the supply system to provide control over accounting and distribution. In setting up an accounting system, one of the better methods is to classify stock items according to their relative value as part of the total investment. For example, among the parts-supply stocks 15% of the items may represent 70% of the total investment. The next 50% of the items may represent only 20% of the investment, and so on. It is obvious that the former should be handled under a stricter accounting procedure than the latter. This is the only way to get greatest value out of the investment in parts, without devoting excessive time and effort in pinpoint accounting of a host of items that represent only a minor fraction of the investment.

This system also makes it easier to determine the buffer stock which should be carried in each class, inasmuch as the numerous items at lower relative investment usually are rapid-turnover supplies which require larger buffer stocks. The beneficial results of setting up such a system are (1) optimum turnover rates can be established, (2) overstocking and understocking are prevented, (3) obsolescence losses are avoided and (4) stock quantities are more closely related to demand.

Supply depots on the surface and in the mine can be designed to reflect this echelon accounting system. For example, the rapid-turnover times can be stocked at section supply points. These would include such items as hydraulic hoses and fittings, spare cables and leads, contactor and control-system parts and so on. Unit assemblies and other parts that need more care than be accorded them in a section supply point should be kept in the underground shop. Turnover on these is not so rapid and they represent a greater portion of the total investment. Similarly, expensive stock items should be kept in the main parts-supply stockroom.

Maximum control of the inventory demands that a definite procedure be followed in checking supplies into and out of stock. Standard forms will be helpful in controlling all but the rapid-turnover items. The latter can be controlled by delegating to supervisors or certain maintenance men the responsibility of drawing supplies from buffer stocks to keep section supply points properly stocked.

Distribution of operating and maintenance supplies must be carefully planned. The value of a supply track and a supply-haulage crew is becoming more evident in belt-conveyor mines. The track may be extended into the room-panel entries, or the panel belt may be made reversible, or battery-powered supply trucks may be used for final distribution.

Furthermore, the value of reserving the third shift for distributing supplies, performing routine maintenance and major repairs and for final rock-dusting is recognized at new mines. The need for spare units and spare sections is reduced, and supply distribution does not interfere with production.

Effects on Preparation

As the returns come in they show that continuous mining usually leads to simplified preparation, although there may be some convulsions in instances where conversion from conventional to continuous is taking place. However, the size range of the raw coal is narrower, the amount of very fine coal may be reduced and there is less need for recirculation and blending.

These factors can be taken into account in designing a new plant to receive coal from continuous miners, but in an existing plant the lump and fine coal circuits will have to be adjusted in capacity to compensate for changes in the volume of these fractions.

Good planning is required to contract the less burdened circuits to make room for more capacity or additional units in the circuits handling the median sizes. As this conversion is made, it is wise to analyze the refuse-disposal facilities to determine whether it is possible to pump the refuse into the disposal area.

Dust control at the face may in continuous mining require the use of greater volumes of spray water than in conventional operation. If moisture is critical in sales, and it usually is, or if it might create problems in primary sizing, adjustments will have to be made. This may mean the use of feeders where chutes served before, or a change to wet screening or heated screens. In a dry-cleaning plant it may mean the addition of predriers. In any event, when the conversion is complete, the result should be simplified preparation from feed conveyor to loading chutes.

Committed reserves, present mines	12,580,000,000	tons
Total reserves, present mines	28,300,000,000	tons
Overall reserves mineable at today's or immediate future prices	152,000,000,000	tons

How Much Bituminous . . . East of the Mississippi?

Estimated Reserves of Bituminous Mines Operating in 1955 East of the Mississippi River

	Calculated Committed Reserves, Tons	Average Life in Years at 1955 Production Rate: All Mines	Steel Mines	Strip Mines
Illinois	1,100,000,000	24	..	14
Indiana	340,000,000	21	..	14
Western Kentucky	500,000,000	19	..	20
Ohio	1,050,000,000	28	..	25
Central Pennsylvania	950,000,000	27	..	13
Western Pennsylvania	1,800,000,000	35	..	
Northern West Virginia	990,000,000	24	..	
Southern W. Va. High-Volatile	1,400,000,000	30	..	11
Southern W. Va. Low-Volatile*	1,620,000,000	35	..	
Eastern Kentucky	1,200,000,000	28	..	..
Virginia*	540,000,000	23	..	..
Tennessee	180,000,000	25	..	..
Alabama	910,000,000	70	..	..
Total	12,580,000,000	29	31	17**

*Low-volatile mines in Virginia included in southern W. Va. low-volatile.
**Includes data for a few strip mines in states where separate life figures are not shown.

By IVAN A. GIVEN
Editor, Coal Age

ACCELERATION is the order of the day in industrial expansion east of the Mississippi, with the new pot lines of the aluminum industry as added starters. One reason is the availability of low-cost coal-based power. This in turn depends upon the availability of coal—also at a low cost. The impact of this increasing demand on reserves therefore becomes a matter for thought and investigation. How much bituminous coal is available in the fields east of the Mississippi? And perhaps more important, how much is available at a reasonable mining cost?

Committed Reserves

It is obvious that the answers to these question can be at best only approximations, since accurate information can be obtained only by thorough exploration of thousands of square miles of coal-bearing territory. This study of the situation, therefore, will be limited to a discussion of the reserves at going mines, with some comments on how these may relate to overall reserves in the area.

Reserves at going properties are divided into two categories for the purposes of this study:—first, "Committed," and second, "Total Mine." Committed reserves are those already assigned to operating properties. Total mine reserves are the sum of committed reserves plus other coal held by the operators but not yet assigned to any mining property.

Committed reserves have been approximated from information supplied for the 1956 *Coal Mine Directory*, reprinted from the *Keystone Coal Buyers Manual*, a *Coal Age* affiliate. This information consists of (a) production in 1955 and (b) expected remaining mine life. This information is listed for mines producing well over two-thirds of the total coal mined in the United States and in the area east of the Mississippi. Multiplying the two yields a figure on "committed reserves."

It is obvious that the method has drawbacks but the results nevertheless can be accepted as reasonable approximations. On that basis, apparent committed reserves for thirteen producing fields east of the Mississippi are shown in the accompanying table. The total is 12,580,000,000 tons. At the 1955 production rate, the average life of these reserves would be 29 yr. The actual life could be up to one-third or more less than the calculated figure, depending upon the allowance for losses in mining and preparation.

Separate calculations on years on life were made for steel-owned and strip mines. The average for the steel mines was 31 yr; for the strip mines, 17 yr—in both instances before any allowance for losses in mining and preparation. The apparent life of going strip mines ranges from 11 yr in West Virginia up to 25 yr in Ohio, with states in between as follows: Pennsylvania, 13; Illinois and Indiana, 14; and West Kentucky, 20 yr.

Total Mine Reserves

Data on total reserves held by mining companies is somewhat meager. However, enough exists in the annual reports of certain companies, and in reports to *Keystone* by coal-mining and land-holding companies, to set a benchmark or two. Thus, companies producing slightly over 61 million tons in 1955 report total reserves of 4,234,000,000 tons. The committed reserves (calculated or reported) of these companies totalled 1,407,000,000 tons. Thus, these companies, for each ton of output in 1955, had 23 tons of committed reserves and 69 tons of total reserves, or a 1 to 3 ratio.

Does this 1 to 3 ratio hold for the entire bituminous industry east of the Mississippi? Probably not. It is based on holdings of larger and stronger companies presumably better able to acquire and hold reserves. At the other end of the scale is a fair number of properties with no reserves beyond those already committed. Between are properties with varying holdings between the extremes—these extremes, incidentally, including totals beyond

USGS Estimates of Bituminous Reserves in States East of the Mississippi, Jan. 1, 1953

	Tons
Alabama	65,848,000,000*
Georgia	76,000,000
Illinois	137,009,000,000
Indiana	35,215,000,000
Kentucky	118,973,000,000*
Maryland	1,196,000,000
Michigan	220,000,000
North Carolina	110,000,000
Ohio	82,972,000,000**
Pennsylvania	72,376,000,000
Tennessee	24,985,000,000*
Virginia	10,833,000,000
West Virginia	105,672,000,000
Total	608,000,000,000**

*Pre-1928 estimate made under supervision of Marius R. Campbell.
**Pre-1928 estimate made under supervision of Marius R. Campbell. Survey by Russell H. Brant, Ohio Geological Survey, in 1956, puts reserves at 36,702,000,000 tons and the total reflects this lower figure.

87 yr, or three times the average of 29 yr for committed reserves.

Companies producing over 2 million tons a year accounted for over 50% of the 1955 output. These are companies to which "larger" can be applied, as well as "stronger." If it can be assumed that half the present organizations east of the Mississippi average 87 yr of reserves, and if two further assumptions can be accepted as reasonable, it is possible to obtain an indication of the reserves of present producers. One assumption is that one-fifth of the present producing capacity has no reserves beyond those already committed. The second is that the remaining 30% fall somewhere between 29 and 87 yr—say an average of 50 yr. With these assumptions, the approximate total reserves of present operations east of the Mississippi work out as follows (in millions of tons, based on 1955 output):

Companies with only 29 yr of reserves (20% of the output), tons	2,550,000,000
Companies with 50 yr total reserves (30% of the output)	6,600,000,000
Companies with 87 yr total reserves (50% of the output)	19,150,000,000
Total reserves, present bituminous mining operations east of the Mississippi	28,300,000,000

In appraising the reasonableness of this approximation, it is necessary to consider the method of calculation and the data employed. The results in this instance are presented because it is believed that in the absence of more concrete information from more producers the method and the data result in a closer approach to the actual total of reserves held by bituminous mining companies east of the Mississippi.

These reserves, for the most part, can be considered as coal that can be mined at today's prices, or at prices that may be expected to prevail in the relatively near future.

Overall Reserves

There is of course no question but what there is much more than 28 billion tons of coal that can be mined economically now or in the immediate future. The latest estimate of overall remaining United States reserves appears in USGS Circ. 293, "Coal Reserves of the United States (A Progress Report, Oct. 1, 1953)." Its estimates of total reserves east of the Mississippi is shown by states in an accompanying table.

For the most part, the reserves are those remaining as of Jan. 1, 1953, derived from recent surveys and estimates. However, figures for certain states still are based on studies made before 1928 under the supervision of Marius R. Campbell. Ohio is an example, with Circ. 293 showing total reserves of 82,972,000,000 tons. This total is 2½ times that arrived at by Russell R. Brant in 1956 and included in Ohio Geological Survey R. I. No. 29, "Coal Resources of the Upper Part of the Allegheny Formation in Ohio." Mr. Brant estimates the Ohio total at 36,702,000,000 tons, minus 1,914,000,000 tons of production. Coal in seams from 14 in up is included.

The USGS estimate of total reserves east of the Mississippi is 655,485,000,000, from which probably could be subtracted the difference over the Brant estimate to bring the total down to approximately 608,000,000,000, including coal 14 to 28 in and more than 1,000 ft under the surface.

How much of this 608 billion can be considered economically mineable today or in the near future? One guide is given in Circ. 293, which notes that: "The reserves in ten states have been classified in considerable detail . . . In these states . . . typical of the United States as a whole, 5% of the total is measured reserves in beds 28 in or more thick and less than 1,000 ft below the surface, and 20% is indicated reserves within the same limit of thickness and less than 2,000 ft below the surface. The remaining 75% is inferred reserves, reserves in thin beds and reserves 2,000 to 3,000 ft below the surface."

Applying this 5:20:75 ratio to the USGS estimates for states east of the Mississippi, with adjustment for the new estimate in Ohio, results in a total of 152,000,000,000 tons that could be considered mineable at the prices of today or in the near future. Subtracting one-third for losses in mining and preparation brings the total down to 100,000,000,000 tons.

Summing up, the bituminous reserve picture east of the Mississippi approximates the following:

Committed reserves, present mines (*Coal Age - Keystone* calculation), tons	12,580,000,000
Total reserves, present mining operations (*Coal Age - Keystone*)	28,300,000,000
Estimated overall reserves mineable at today's or immediate future prices (USGS)	152,000,000,000

Even with a loss allowance of as much as 50% in mining and preparation, these totals indicate that all the coal anyone will need will be available at reasonable prices for a long, long time to come in the area east of the Mississippi.

WALKING DRAGLINE is today's answer to thicker overburden in coal stripping. It reaches its maximum range working alone, rather than in tandem where it must cast over the shovel spoil.

Tandem v. Dragline Stripping

Tandem operation may be desirable for various reasons, including making use of shovel already on hand, but dragline working alone can handle more than tandem unit since it does not have to cast over shovel spoil.

By L. C. MOSLEY
Manager, Mining Division, Marion Power Shovel Co.

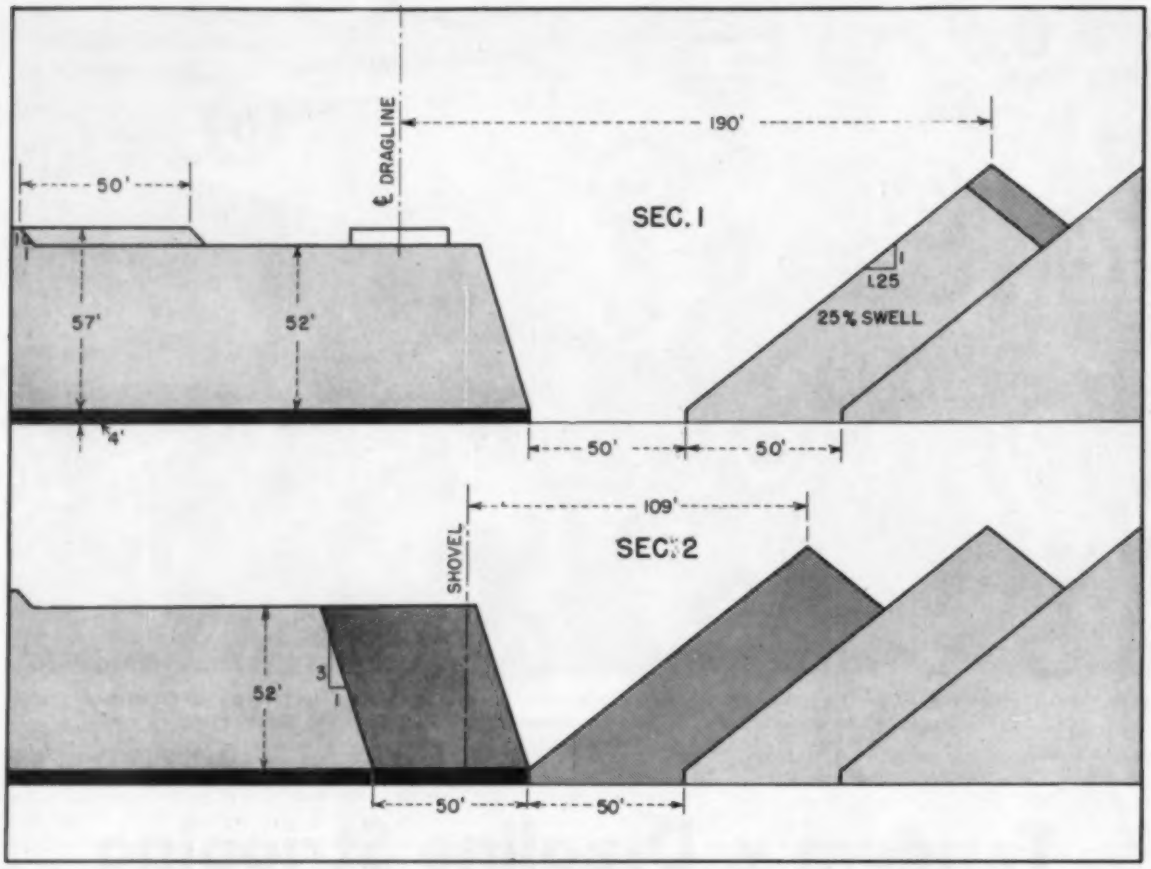
WITH EACH PASSING YEAR there is a decrease in the reserves of strip coal under relatively shallow overburden and, as a result, the depths of overburden are increasing constantly and steadily. The needs and demands for equipment and methods to spoil the deeper overburdens are problems that face many strip-mining companies today.

On some properties shovels have been used for the complete stripping but the depths have increased to where the shovels alone can no longer spoil the overburden. Also, because of the greater overburden depths, the ratios have increased to the point where shovel outputs are not adequate to provide the necessary coal tonnage.

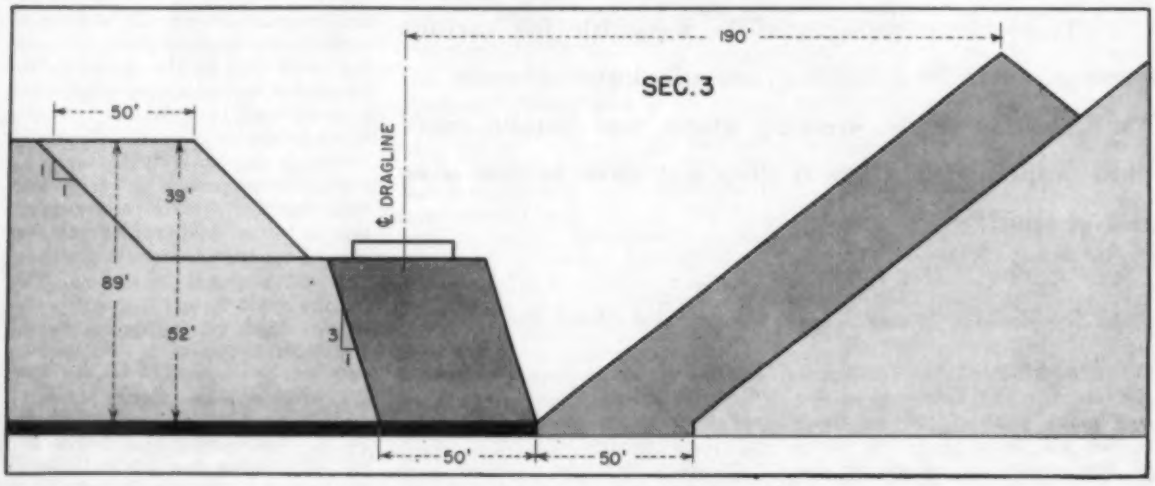
In many instances a shovel is in good operating condition and the remaining unamortized investment in the unit makes it extremely desirable to continue its use, rather than to dispose of it at a sacrifice or even junk price. The problem is to supplement both the range and capacity of the shovel by installing a walking dragline to be operated in tandem with the shovel. The usual method in such an operation is to locate the dragline on or near the surface to strip the top material down to a certain level and let the shovel follow to remove the remaining overburden from the coal.

While this is a practical means of operating and it is being used on numerous properties, it frequently turns out that there is a misconception as to the overburden depth that may be spoiled when working a dragline and a shovel in tandem. This misconception is that a greater overburden depth can be spoiled by the two units operating in this manner than can be disposed of by the dragline when working alone.

This is not true, as will be shown by the explanations that follow and the pit sections that are included to illustrate the points made, which are based on a comparison of the total overburden depths that can spoiled when the stripping units are operating in tandem and when they are working alone. In making this comparison, two machines of moderate size have been selected—a Marion 5323 crawler-mounted shovel and a Marion 7400 walking dragline. The former is equipped with a 20-cu yd



HOW SHOVEL AND DRAGLINE used as examples divide job of removing 57 ft with shovel at maximum range.



MAXIMUM BURDEN dragline alone can handle is 89 ft.

dipper and a 105-ft boom; the latter with an 11-cu yd bucket on a 200-ft boom set for a dumping radius of 190 ft.

Conditions vary widely on different properties and it is not possible to determine definitely the maximum overburden depths that can be stripped with any equipment unless the conditions are known. In preparing the pit sections used to illustrate this article, the calculations were based on the following, which may be considered as typical for a number of stripping operations in these days of thicker overburden:

Slope of highwall above dragline bench	1 to 1
Slope shovel and dragline highwall below bench	1 to 3
Slope of spoil	1.25 to 1
Swell of spoil	25%
Thickness of coal seam	4 ft
Width of cut	50 ft

All pit sections included to illustrate how the various types and combinations of equipment are used are based on making straight cuts of equal width in overburden of uniform depth, and no consideration has been given to the influence of outside or inside curves on the overburden depths that may be spoiled. For the dragline, the operating radius on which the pit sections are based is that obtainable when dumping the bucket under the boom point. An expert operator can obtain a somewhat greater radius by "throwing" the bucket beyond the boom point at the time of dump.

Tandem Stripping

Tandem operation of the dragline and shovel is illustrated by Sec. 1 and 2. These show the work done by each unit in stripping a total overburden depth of 57 ft.

Sec. No. 1—Here the dragline is located on a bench 5 ft below the surface and 52 ft above the top of the coal. The reason for locating this unit on a bench is to provide a better footing for the tub and to obtain the fullest advantage of the dragline's dumping radius for spoiling the material. The tub is 10 ft back from the top edge of the highwall, a distance considered safe for most operations.

From the position shown, the dragline makes a cut 50 ft wide in the top 5 ft of overburden by dragging the bucket down from the surface to the bench level. The overburden removed by the dragline is cast over on top of the spoil from the preceding shovel cut and at a radius of 190 ft, which is the maximum obtainable from the 200-ft boom combination on the dragline unit. It should be especially noted that the dragline spoil must be carried over the 50-ft width of open pit from which the coal has been loaded out, since it is necessary to leave this 50 ft open as a base for the next shovel-cut spoil.

Sec. No. 2—After the dragline has removed the top 5 ft of overburden, the shovel uncovers the coal seam by making a 50-ft wide cut in the remaining 52 ft of overburden. The material removed by the shovel is spoiled in the manner indicated, and at a maximum radius of 109 ft. Spoiling this depth of overburden requires the maximum combination of operating ranges obtainable from the shovel and 52 ft of overburden is the maximum the shovel can spoil.

Thus, when operating under the conditions shown in Secs. 1 and 2, both the dragline and the shovel are being operated at their maximum spoiling ranges. Therefore 57 ft of overburden is the greatest depth they can dispose of when working under the conditions shown.

It is obvious that the division of the total overburden depth shown on Secs. 1 and 2 results in an unbalance in the work done by the two machines. In reality a more equitable division, from an output capacity standpoint, would be about 17 ft for the dragline and 40 ft for the shovel. However, to illustrate how little greater depth can be spoiled in tandem operation than can be spoiled by the shovel working alone, it was felt that the division should show the maximum depth the shovel alone can spoil.

As will be noted, all of the coal has been removed from the pit and no berm has been left for the haulage trucks. Leaving a berm would result in an additional distance over which the dragline spoil would have to be carried and the total depth which could be stripped would be lowered significantly. For a 30-ft berm width, the maximum depth that could be spoiled by the tandem unit would be reduced to approximately 40 ft. Since this is much less than the 52 ft that the shovel can spoil alone, tandem operation of the shovel and the 200-ft-boom dragline is of no advantage from a range standpoint.

The alternative solution to this problem of leaving a berm in the pit is to increase the boom length and dumping radius of the dragline. By equipping the dragline with a 235-ft boom, set for a radius of 220 ft, the dumping radius of this unit would be increased 30 ft. Thus, when stripping the 57-ft depth of overburden shown in Sec. 1 with this front end, it would be possible to leave a 30-ft coal haulage berm in the pit. However increasing the boom length from 200 to 235 ft would necessitate reducing the bucket size from 11 to 7 cu yd.

Dragline Stripping

Sec. 2 shows that the maximum overburden depth that can be spoiled by the shovel, either working alone or in tandem with the dragline, is 52 ft.

Sec. 3 shows the dragline working alone and stripping 89 ft of overburden. The front-end combination consists of an 11-cu yd bucket on a 200-ft boom, set for a dumping radius of 190 ft. This is the same front end as in the tandem operation illustrated by Sec. 1.

The dragline is located on a bench 37 ft below the surface and 52 ft above the top of the coal, the tub being 10 ft back from the edge of the highwall. In these respects the position of the dragline, in relation to the toe of the highwall, is exactly the same position as that illustrated in Sec. 1.

From the position shown the dragline makes a cut 50 ft wide in the top 37 ft of overburden by dragging the bucket down from the surface to the bench level. It also drags the bucket up in the conventional manner to remove the remaining 52 ft of overburden between the bench level and the coal, thereby uncovering a 50-ft cut of coal. The overburden removed by the dragline is spoiled in the pit in the manner indicated, and at a maximum dumping radius of 190 ft.

Since a 190-ft dumping radius is the maximum obtainable from the 200-ft boom combination on this dragline, 89 ft of overburden is the maximum that can be spoiled by this unit.

Again no provision has been made for a coal haulage berm. If a 30-ft wide berm were left in the pit, the maximum overburden that could be spoiled by the 200-ft boom combination on this dragline would be reduced from 89 to 70 ft.

Shovel v. Dragline

Since the spoil from the shovel is cast over into the open pit adjacent to the cut being made, there is no difference in the overburden depth that can be spoiled by the shovel whether operating in tandem or working alone.

There is a vast difference, however, in the total depths that can be spoiled by the two units when operating in tandem and by the dragline working alone. From the previous explanation and a study of the various pit sections it should be easy to see why the total overburden depth that can be spoiled by the dragline and shovel in tandem is less than can be spoiled by the dragline when working alone.

In considering tandem operation of a dragline and a shovel, there is one essential factor to be kept in mind. That is that it is always necessary for the dragline spoil to be carried over an extra pit width. When the dragline is working alone the spoil is cast over into the pit adjacent to the cut being made and the dumping radius required for a specific overburden depth is less by a pit width than the radius required for the tandem operation.

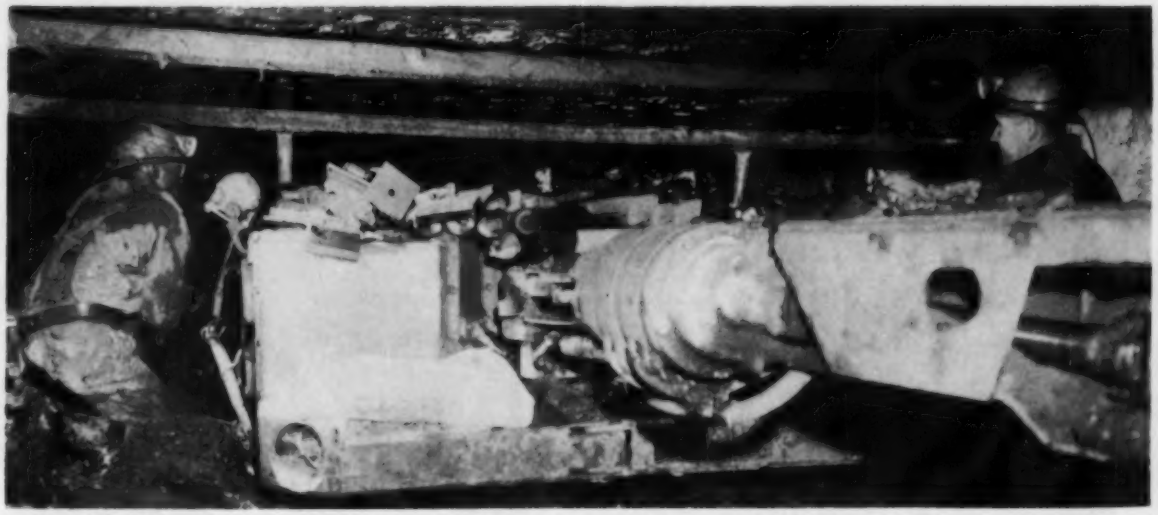
Continuous miners and conventional units carry production load as . . .

CONTINUOUS MINER and pickup loader provide a steady flow of coal to shuttle cars in development work. Units average 400 tons per shift from the American seam which has an average thickness of 55 in.

UNIVERSAL CUTTER is key machine in conventional sections. Coal is cut near lower rock parting, sheared along rib.

TRANSPORTATION SYSTEM includes 42-, 36- and 30-in belts in lengths up to 4,023 ft and speeds to 550 fpm.

SLOPE BELT flattens out to coal level at foot of opening. Unit travels 470 fpm and carries 4,000 tons per shift.



ROOF SUPPORT at face is provided by wooden crossbars raised to position by jacks on each side of continuous miner. Screw jacks are then set under ends of bar before the machine advances into the coal face.

. . . Maxine Mine Triples Output

Alabama By-Products' skillful planning of original operation keys smooth expansion to over 2 million tons of raw coal in year.

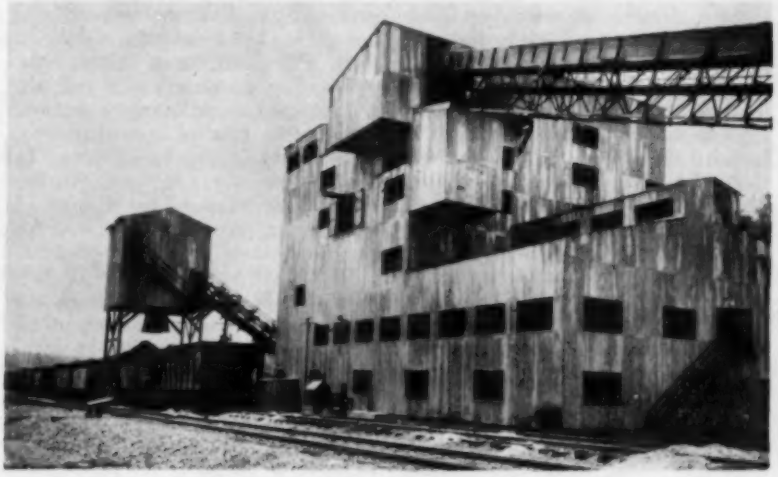
BOOSTING PRODUCTION nearly 300% within a year smoothly and without hitch is a major recent achievement in the history of the Maxine mine of the Alabama By-Products Corp. This smooth transition to a mine producing 1,584,000 tons of clean coal per year from one yielding 588,000 tons resulted from skillful planning of the original mine and preparation plant plus development of the mine to permit rapid expansion.

Maxine mine is somewhat of a milestone in Alabama mining history. It is the first large commercial deep mine opened in Alabama in some years. It also is the first commercial mine in Alabama whose output goes entirely to one affiliated group of customers.

The need for more low-cost coal for power generation in Alabama became real in 1952 when Alabama Power Co. broke ground for the Barry steam plant near Mobile. Power company officials wanted to use Alabama coals as much as possible in the new and proposed steam plants, but they also wanted the Alabama coals to be competitive in cost with those available from other states.

Alabama By-Products had reserves of coal that could be transported by rail or water to the expanding plants of the Alabama Power Co., Georgia Power Co. and the Gulf Power Co., all of whom are associated with the Southern Co. Mining officials were confident that the company could open a new mine that could produce coal that would be competitive with the cost of out-of-state coal. As a result a contract was signed with the power company and Maxine mine was developed. The recent expansion of Maxine is proof that the original estimates were correct and Alabama coal will be counted on in the future more and more for generating power.

The first coal was mined, prepared and loaded into railroad cars on July 7, 1954. Operating two shifts, the mine was expanded as quickly as possible to produce 588,000 tons of



PREPARATION PLANT features dense-media cone for washing coarse coal, wet tables for fines, and raw- and clean-coal storage. Plant reject is 33%.

ROOF-BOLTING is handled by one man who uses hydraulic rotary machine to install expansion-type bolts.

HYDRAULIC DRILL permits two men to bore holes quickly with a minimum effort. Men also cut coal.

Auxiliary units boost efficiency

clean coal per year. Management anticipated that the mine had a good chance to be enlarged to 1,000,000 tons per year within 3 yr and planned development accordingly. The anticipated expansion was based on the projected fuel needs of the power group.

These fuel needs expanded as anticipated and on Jan. 25, 1956, Alabama By-Products met with the power group to work out an agreement to boost production to 1,056,000 tons per year. To the mining company, this meant that more mining equipment had to be bought, more underground development scheduled and the preparation plant expanded. Other expansion included enlarging the bathhouse, increasing both shop space and facilities and adding to the supply house.

For the expansion to 1,056,000 tons per year three complete mining units were added. Two of the units included Joy Super 14-BU loaders, Goodman 2400 cutters, two Jeffrey 66-C4 shuttle cars, Joy RBD 15 roof bolting machines and Hewitt-Robins 30-in belt conveyors. The third unit consisted of a Joy 3-JCM continuous miner, Joy 8-BU loading machine, two Jeffrey 66-C4 shuttle cars and a Hewitt-Robins 30-in belt conveyor. This boosted the underground units to eight, including four conventional sections.

This expansion was fairly well underway when a further expansion to 1,584,000 tons was approved on Aug. 23, 1956.

BATTERY-POWERED TRACTOR and trailer hauls supplies to face from supply cars on track. All mine supplies are handled by special crews.

In the expansion to 1,584,000 tons per year, two additional conventional units are being added, making a total of ten sections of which eight will operate on three shifts and two will be used as maintenance sections and to take care of belt extensions, moves, and major breakdowns. In addition to the ten units underground, the company has a spare of each major piece of equipment for use in a major rebuilding program.

With this arrangement peak production will be obtained from the eight units that are producing, on all three shifts at all times. For the washing plant spare units, such as pumps, screen mechanisms, speed reducers, etc., were purchased. This was done to simplify maintenance problems and to minimize the chance of having extensive shut downs as the result of failure of a key unit.

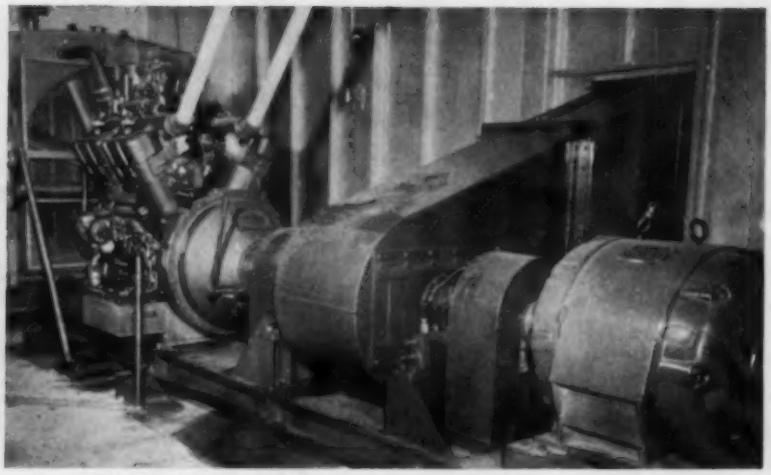
WHERE THE MINE IS LOCATED

Maxine mine taps the American seam in Jefferson County about 3 mi from Praco. Railroad transportation is provided by the L. & N. R. R. which built a 3.4-mi spur to link the property with its Cain Creek branch. The slope operation is only 2,500 ft from Mulberry Fork of the Warrior River, on which much of the coal is shipped. The method of transportation depends on the power plant to which coal is being shipped.

MINING CONDITIONS

The American seam is split by three separate layers of rock. Two of these, separated by 3 in of coal, are ½ and 3 in thick and are fairly uniform in thickness. They are 14 in from the top of the seam. The third rock split varies in thickness from 5 to 24 in and is 11½ in up from the

TESTING for methane is one of the duties of Maxine's safety inspector.



FAN DRIVE includes both electric and auxiliary gasoline drives. Jack shaft with drive pulleys was balanced dynamically before being put in service.

TEMPORARY OVERCAST is made with steel tunnel liner sections. Units are recovered after area is mined out and reused in new section of mine.

COMMUNICATION underground is simplified with phones on jacks.

bottom of the seam. This variable rock parting was the main reason why conventional units rather than continuous miners were added in the expansion program. The rock parting is hard and the company learned that it is impractical to use continuous miners when it becomes more than 10 in thick.

Average total seam thickness, including partings, is 55 in. A firm, sandy fireclay that does not soften in contact with water provides a firm roadway for mobile equipment. A solid shale forms the immediate roof and generally is very strong. There are some vertical cracks in the formation but the mine is laid out to cross these at an angle and therefore they do not affect mining.

Cover on the coal runs from 100 to 400 ft in thickness with 80 ft at the slope site. In areas where the cover is thin, extremely bad roof conditions are encountered and 4 to 20 in of draw rock plus a heavy inflow of water make mining difficult.

The company had an aerial survey made and topographic maps prepared. These, along with diamond drill holes, have provided management with a useful tool in projecting mine workings, especially in areas with thin cover.

HOW THE MINE IS LAID OUT

Maxine is an all-belt mine with all entries projected on 90 deg. Access to the operation is by two slopes driven 16 deg with the horizontal. One opening serves as a combination belt haulageway, air intake and manway. The other is used as an air intake and supply way.

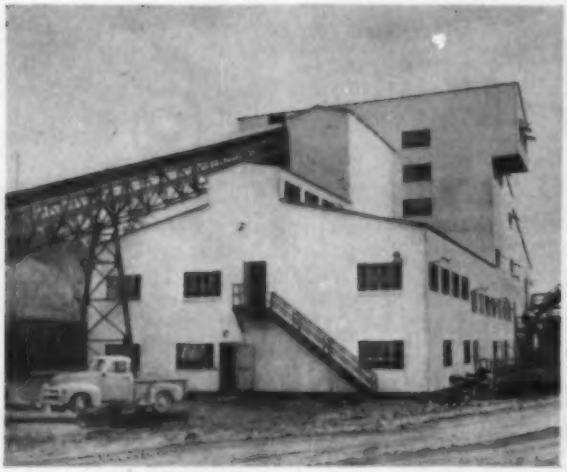
The mine is laid out with main entries separating the property into major subdivisions. These in turn are divided by primary panel entries from which secondary, or room, panel entries are driven.

Primary panels are projected on 6,200-ft centers and secondary panels are driven from these on 4,300-ft centers. Off each side of a secondary panel four room panels are driven to a depth of 1,800 ft.

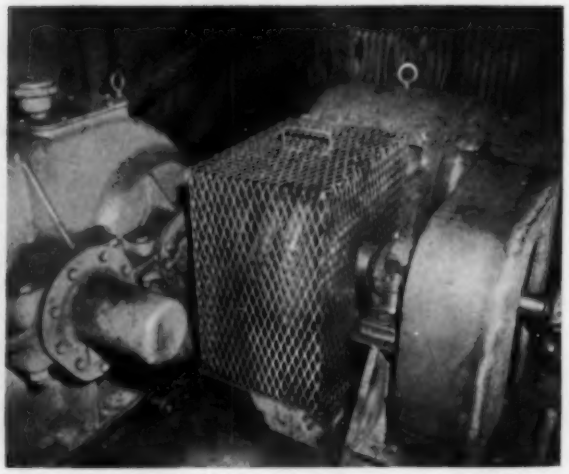
Mains, primary and secondary entries are developed with nine headings 16 ft wide on 46-ft centers. Room entries are developed with three 16-ft headings on 46-ft centers. When mined with conventional units, rooms are driven 28 ft wide on 52-ft centers to a depth of 265 ft.

CONTINUOUS MINING METHODS

Early experience at Maxine during the first years of operation indicated that continuous miners could be used



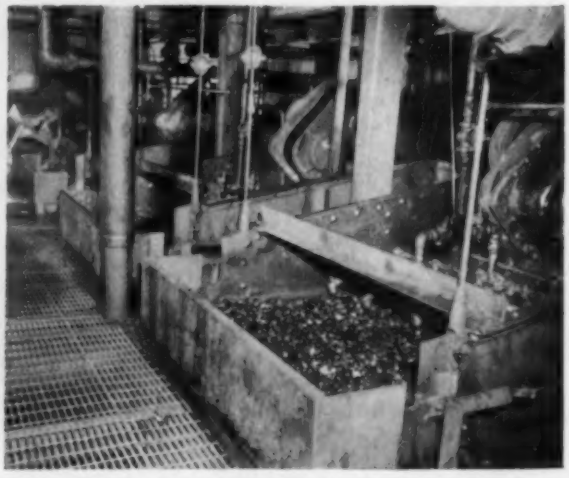
PLANT EXTENSION has six new tables and auxiliary units. Foresight in original design eased expansion.



FLUID COUPLING on clean-coal scraper conveyor protects speed reducer against damage in event of overload.

Expanded plant handles increased tonnage easily

FINE-COAL CLEANING is handled by wet-washing tables. Sixteen tables receive feed from three distributors.



VIBRATORS remove excess water and medium from 4x¼ coal and refuse after separation is made in cone.

most effectively in development work, and that conventional equipment performed best in room work. As a result, the company now uses the two types of equipment regularly for these types of work. Alabama By-Products reached this decision because of the varying conditions in the American seam, particularly the changing thickness of the rock parting, and because conventional equipment could reach its production potential in wide working places.

Equipment assigned to a continuous mining section includes a Joy 3-JCM continuous miner, 8-BU pickup loaders and two Jeffrey shuttle cars.

Two of the Joy ripper-type continuous miners are advancing nine headings in a main entry. Each machine works four headings and the center opening is worked by either one, depending on the rates of advance. Thus by using the center heading as an extra place the two continuous miners are kept together. Working two shifts per day, the two machines advance the nine headings an average of 750 ft per month. The third machine is driving nine headings in an entry where speed in development is not urgent.

A continuous mining crew includes the following men: two face men, whose duties include placing screw jacks under temporary roof collars, extending curtains, rockdusting, and shoveling [illegible] coal to the center of the working place; one miner operator; one pickup loader operator; two shuttle car operators; one utility man, who cleans up along the belt line and relieves other crew men during their lunch period; one ventilation man, who also helps rockdust; one roof-bolter; and one electrician. In addition, one foreman divides his time between the two crews. Production from each miner crew averages 400 tons of raw coal per shift.

If continuous miners are used for room work, one room is driven at a time after ventilation has been established by driving a pair of rooms. Spaced on 30-ft centers, rooms are driven 16 ft wide and 265 ft deep.

When the room is completed, the

RIVER DESTINATION of clean coal is either barge or stockpile fed by belts at end of overland conveyor.

STOCKPILING at river is simplified by loader-piler belt. Unit throws coal 90 ft from end of stockpile belt.

continuous miner and one shuttle car move to a new room site. The Joy 8-BU pickup loader, the second shuttle car and part of the crew remain in the room to pick up any remaining loose coal and to rockdust. When this job is completed, they rejoin the continuous miner in the new room. Roof-bolting is not done in continuous-mining rooms. Instead the roof is supported on 4-ft centers by 3x8-in by 14-ft wooden crossbars held in place by screw jacks. Crossbars and jacks are later recovered and stored in breakthroughs adjacent to unmined rooms. When the continuous miner cuts through into these breakthroughs, the materials are available for reuse.

CONVENTIONAL METHODS

Five conventional mining units are now in use at Maxine. Each unit includes a Joy Super 14-BU loader, Goodman 2400 universal cutter with 9-ft bar; two Jeffrey 66S-C4 shuttle cars, Joy RBD 15 roof-bolter and hydraulic handheld coal drill.

The nine-man face crew includes a cutter operator and helper, who also drill and shoot; loader operator and helper; two shuttle-car drivers; one roof-bolter; one utility man and one ventilation man. Production averages 525 tons of raw coal per shift.

Entry development and room work are carried out alternately when room panels are worked with conventional equipment. For example, the three panel headings are advanced 250 ft and the belt is extended 250 ft in the center heading. Four rooms on 52-ft centers are next turned off the right side of the panel and driven 28 ft wide to a depth of 265 ft. Breakthroughs are cut on 76-ft centers. When a set of rooms is completed the equipment moves back into the headings and advances them another 250 ft.

When the right side of the panel is completed, rooms are mined on retreat on the left side. Room and chain pillars are not recovered.

HOW COAL IS HAULED

Coal is carried from the producing areas to the preparation plant over a network of belt conveyors ranging from 650 to 4,023 ft in length. Room-panel belts are 30-in Robins units. Secondary, primary and main-entry belts include Transall, Continental Gin and Robins 36-in units. The slope belt, a Continental Gin unit, is 42 in wide and provides a 650-ft link between the preparation plant and the underground mine. The slope, main, primary and secondary belts are driven by 440-v AC motors joined to speed reducers by Twin Disc fluid couplings. All belt splices on these conveyors are vulcanized. Sections of belt on the 30-in room-panel units are joined with Flexco splices.

Room-panel belts travel 325 fpm, all 36-in belts run at 550 fpm and 42-in slope belt travels 470 fpm.

ROOF SUPPORT

Mine roof is supported primarily by roof bolts installed as soon as possible after coal is extracted. Minimum support permitted in belt headings is ¾x30-in expansion-type bolts set in rows on 4-ft centers. Four bolts are installed in each row along the beltway. In other headings, three bolts are installed in each row.

In a nine heading entry being developed with a continuous miner under good roof the two outside headings are not bolted. But when these are driven with conventional equipment all headings are bolted. In room work with conventional equipment, bolts are installed on 6-ft centers in rows 6-ft apart.

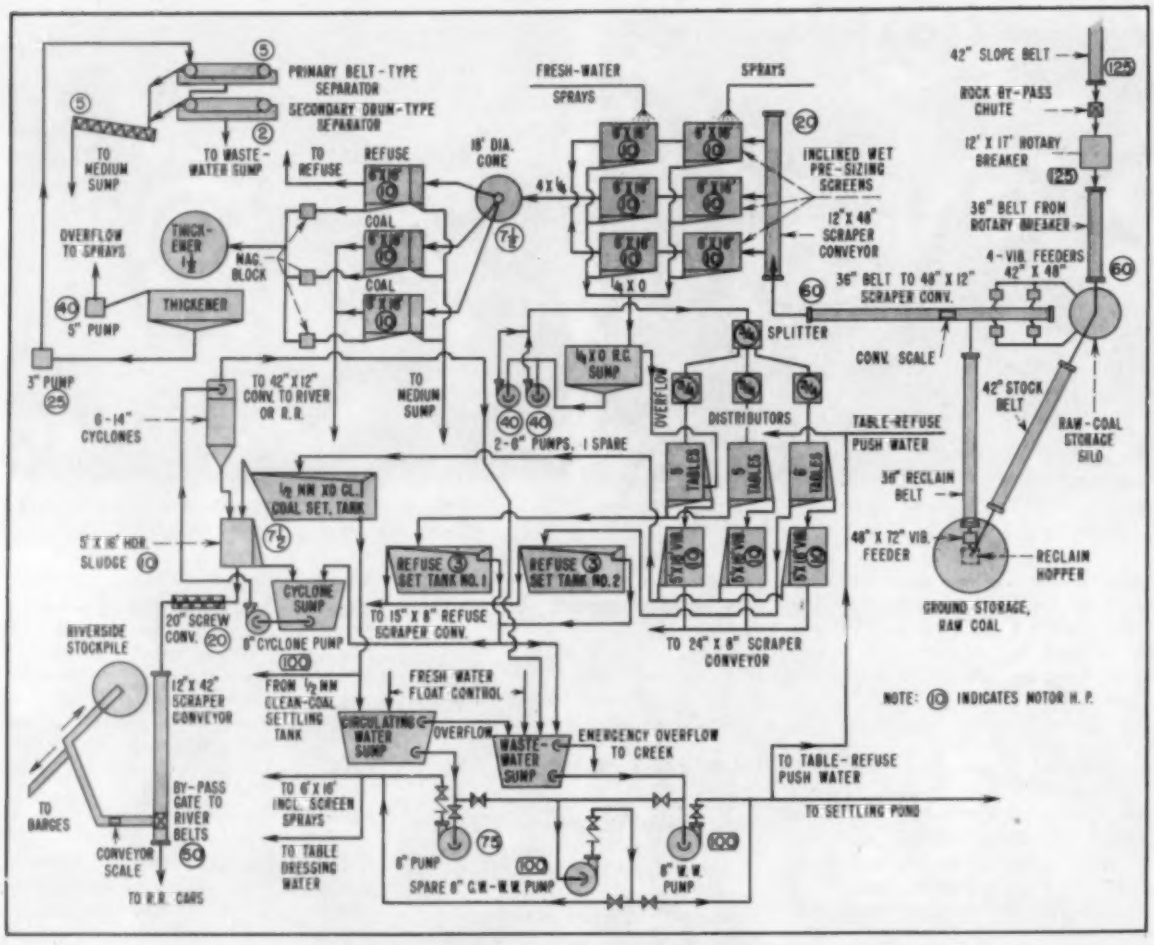
If more support is needed above the minimum standards, 2x8x24-in wood headers are installed with the bolts. If this is insufficient, longer bolts are installed along with the headers.

Bolts are recovered whenever possible. Two men are employed nearly full time at this job. Before any bolt is loosened, the roof is examined thoroughly and four Duff Norton screw-type roof jacks are set for protection. Bolts are removed with the aid of an air impact wrench and carried to a central point from which they are later picked up and reused. In an average shift the two men recover 450 bolts, of which 85% are reuseable.

MAINTENANCE

Maxine mine recently has set up a maintenance training program designed to improve the skills of underground maintenance men. The program was developed through the cooperation of the company and the state education service. Key man in the program is the maintenance superintendent who works closely with the state educators. The program is designed to be as practical as possible and is set up to deal with the types of problems met in the mine. The mine superintendent and the class instructor work out the program.

Every underground maintenance man will have an opportunity to participate in the program. Men are brought to the shop two at a time



HOW COAL IS STORED, cleaned and stockpiled at Alabama By-Product's Maxine plant.

to gain practical experience in major overhauls. Present plans call for the two men to be assigned to the shop for a period of 4 to 6 wk. But the length of time spent in the shop also is tied to the overhaul schedule. For example, it may take longer to rebuild one type of machine than another. To make the shop training more valuable to the men the company tries to bring the men to the shop when equipment similar to that in their section is being rebuilt.

In all instances the men follow the rebuilding job through from start to finish. The last 45 min of each day are spent with the shop supervisor discussing any problems that may have come up during the day.

POWER SYSTEM

Power is delivered to Maxine at 44,000 v and stepped down to 4,160 for company use. An overhead 3-wire system with ground carries power to surface substations located over the main entry. Each substation, a prefabricated Birmingham Steel Building, houses a 500-kw General Electric or Westinghouse rectifier that converts power to 275-v DC.

The DC power is delivered to the mine through boreholes by 1,500,000-cir mil positive and negative feeders enclosed in neoprene jackets. At the foot of each borehole feeder switches connect the feeders to the underground system, which is made up of 1,000,000-cir mil feeders plus the bonded 60-lb supply track. To provide good power for operating face equipment, Alabama By-Products keeps the distance to the power load within 2,600 ft of the borehole.

All motors on main-entry belts are, as noted, 440-v AC. When a new belt drive is set, a borehole is drilled from the surface to intersect the heading at a point where the drive will be set. The 4,160-v AC power is stepped down to 440 on the surface by a three-phase 112-kva transformer. It then is transmitted into the mine by a three-conductor 350,000-cir mil cable covered by a neoprene jacket.

Because of the severe electrical storms in the vicinity, company officials make special efforts to provide lightning protection for electrical equipment. All power cables going down boreholes are protected by lightning arrestors and separate arrestors are provided for the overhead pole line. The overhead ground wire also is grounded to earth at every third pole.

Frame grounds on the rectifier substations are separate and join the ground from the incoming AC line underground. Thus any lightning surge on the pole line that might possibly pass through the arrestors will pass to ground before it reaches the rectifier. Regular tests for resistance are made in the ground circuit and if resistance to ground is more than 8 ohms the ground is checked and repaired. The company reports that lightning damage has been cut considerably by this method.

Surface substation buildings, 40x16 ft, are designed so they can be taken apart in sections and hauled to a new site by a truck trailer. First a 6-ft center section is taken out, leaving two 17-ft sections. With the 6-ft section removed, the remaining sections can be loaded on a special trailer and hauled intact.

Each section has an eyebolt at the top so it can be hoisted onto the special two-wheel trailer. Built with an inside frame, the trailer is made as narrow as possible. The company saves about $200 per move with the prefabricated buildings. It takes three men two days to reassemble one.

SUPPLYING THE MINE

Mine supplies are delivered to the various mining areas over a 60-lb track system laid on steel and treated wood ties. Supply cars are loaded on the surface and lowered to the foot of the slope. From this point, 6-ton trolley locomotives pull the supplies to the room-panel belts or to the end of the track in the mains.

Supplies are delivered to working places by battery-powered tractor-trailers. A special material crew distributes the supplies and also extends or recovers belt conveyors.

VENTILATING THE MINE

Fresh air is supplied by a Jeffrey 8-ft Aerodyne fan which is belt driven through a Rawson coupling by a 200-hp 440-v Westinghouse motor. The motor is started by a primary-resistor starter under no load. When speed reaches 440 rpm the Rawson coupling engages the fan.

An emergency drive for the fan is provided by an auxiliary LeRoi gasoline engine, which also operates through a Rawson coupling. Both drives are mounted on one rigid base which can be moved on its supports to adjust belt tension.

Four of the nine headings in the main entries serve as intakes and four as returns. The middle heading, or beltway, is on a separate split. The two outside headings on each side are returns. Room panels have one intake, one return and the middle heading is a separate split for the belt.

Permanent overcasts on main entries are built of concrete blocks with steel H beams and lightweight aggregate concrete slabs completing the overhead portion. Slabs are 2¾ x 18 x 48 in and are slid between the flanges of the H beams. All joints are plastered to make the overcast airtight. Temporary overcasts at room panels are made of sections of Armco tunnel liner. These are recovered when a panel is completed and are reused.

PREPARING THE COAL

Foresight in designing the original Maxine preparation plant made it possible for the increased tonnage to be handled with a minimum of alteration. For example, the original conveyors were designed to carry the present tonnage and in most instances space was left for the additional equipment that would be needed. The biggest tasks included extending the plant and adding six wet washing tables, installing more screens and placing spares for key units. While these changes were being planned, the company also decided to add facilities to provide ground storage for raw coal adjacent to the plant and to add a refuse belt conveyor to carry refuse to a bin at the top of a nearby hill. Plant reject is 33% and a large refuse-disposal area is needed.

Raw coal discharges from the 42-in slope belt into an 11x19-ft Bradford breaker that reduces it to 4x0 and removes large pieces of refuse. Breaker refuse is carried to the refuse belt.

DENSE-MEDIA WASHING

The 4x0 breaker product drops onto a 36-in belt that elevates it to an 800-ton concrete-stave storage silo. Four Jeffrey-Traylor feeders under the storage bin then deliver the coal to a 36-in belt where it is weighed by a Weightometer as it is carried to the top of the cleaning plant. Tramp iron is removed by a Stearns magnet before the coal discharges onto a 48-in scraper conveyor. This unit feeds three 6x16-ft Robins vibrating wet-screening units where the ¼x0 is removed. The 4x¼ from the wet screens flows to three horizontal pre-drainage screens that remove excess water and any remaining fines before the 4x¼ passes to an 18-ft Wemco Mobil-Mill heavy-density cone.

Clean coal from the cone goes to a pair of 6x16-ft drainage vibrators equipped with 1-mm stainless steel screens. The drained, sprayed and dewatered coal then is delivered to a 42-in clean-coal conveyor.

Refuse is elevated by air-lift to a dewatering screen, after which it discharges onto a 24-in refuse conveyor for delivery to the refuse belt.

Underflow from the discharge end of the three heavy-media drainage screens flows to a thickener where the magnetite is concentrated. Overflow is reused as spray water on the drainage screens. Underflow is pumped to magnetic separators where magnetite is recovered in a two-step operation with Dings belt- and drum-type units. Magnetite from these units is further concentrated by a densifier before it passes to the medium sump for recirculation.

FINE COAL CLEANING

Underflow from the primary 6x16-ft inclined pre-sizing screens passes to a raw-coal sump, from which it is pumped to a three-way splitter. A spare pump was added in the expansion program to permit continuity of operation in event of a breakdown.

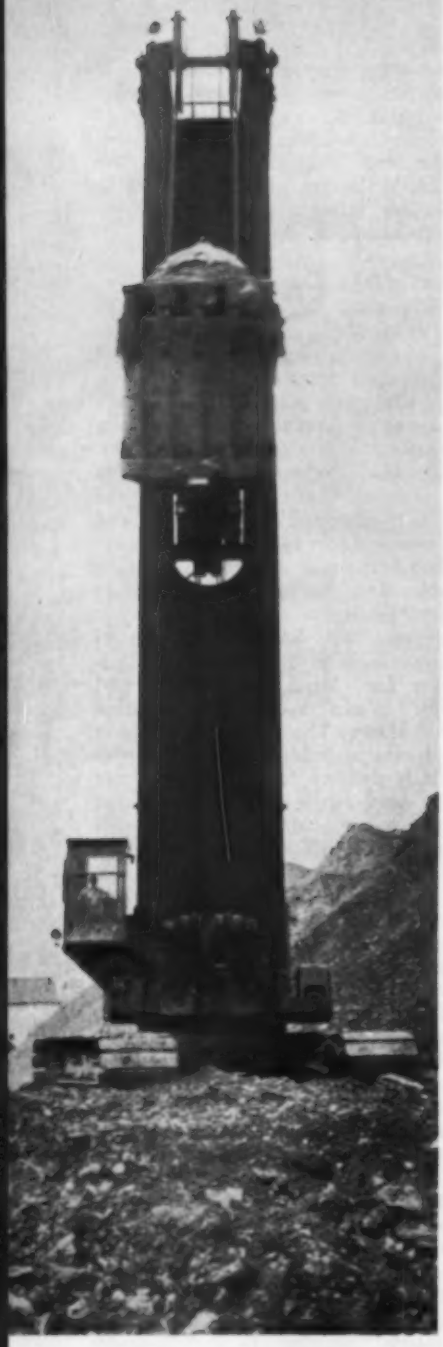
Each of the three splits passes to a Concenco distributor. Two of the units feed equal quantities of coal to two batteries of five Deister Super-Duty Diagonal Deck coal-washing tables and the third feeds a group of six tables.

Clean coal from each group of tables flows to a 5x16-ft Allis-Chalmers Low Head vibrator equipped with ¼-mm and ½-mm stainless steel screen. The dewatered products fall onto an 8x24-in scraper conveyor which delivers it to the 4x¼ from the dense-media cone. The resultant 4x0 may be loaded into railroad cars or sent by belt to the barge-loading site for loading or stockpiling.

The ½mmx0 clean coal underflow from the dewatering units flows to a settling tank where the solid material is concentrated before delivery to a 5x16-ft horizontal vibrating sludge screen. Dewatered overflow discharges to a 20-in screw conveyor and is carried to the 4x0 clean-coal scraper conveyor. Screen underflow passes to a cyclone sump from which it is pumped to a battery of six 14-in cyclones. Cyclone underflow is recirculated to the sludge screen and overflow goes to the waste-water sump. Waste water is pumped either to a settling pond or is used as table-refuse push water.

Table refuse flows to a pair of settling tanks and the concentrate material discharges to an 8x15-in refuse scraper conveyor. This unit carries it to the cone-refuse conveyor for delivery to the refuse belt.

Operations at Alabama By-Products are under the direction of H. J. Hager, vice president, mining operations. Assisting him are G. C. Dyar, general superintendent of mines, and R. J. Miller, chief engineer. The Maxine management team includes W. E. Self, superintendent; James Breland, resident engineer; Marlin McAlpin, mine foreman; Tom Glaze, mine electrician; and T. H. Hood, preparation foreman.



◀ High lift . . . ▲ Long reach . . .

NEW 4-YD STRIPPING SHOVEL, powered by 360-hp vertical diesel engine, leads to higher stripping efficiency to counterbalance rising costs in other

Larger Units—

Bigger bucket, higher lift, more power in diesel drive engine of new shovel help cut costs.

Services such as pit drainage and field repairs are improved through use of special vehicles.

UP-TO-DATE EQUIPMENT for stripping and haulage and well-planned methods that to some extent combine backfilling with stripping lead to higher efficiency at the operations of Teramana Bros. Coal Co., Steubenville, Ohio. The main unit employed by the company in recovering the 60-in Pittsburgh No. 8 seam is a 4-yd Manitowoc high-front shovel which works in cover that normally ranges from 40 to 50 ft in thickness, but which on occasion thickens to 70 ft. Other excavating units include a Manitowoc 3500, two Lima 1201's and two P&H 665B's, all equipped with 2-yd shovel fronts. These smaller units double as stripping units in thinner cover and as loading shovels.

Noteworthy among Teramana methods is their practice of working stripping cuts perpendicular to the highwall on inside curves in order to achieve maximum utilization of available spoil room and to facilitate backfilling. At other sites, when faced with the problem of recovering an "island" of coal under a ridgetop, the preferred practice is to work the cuts across the island perpendicular to the ridge line, rather than opening at the outcrop and following the contours. Thus the thicker cover directly under the ridge line is balanced on every cut against the thinner cover along the slopes approaching the outcrops. Bulldozers working in the spoil area assist the shovels in stacking spoil when necessary.

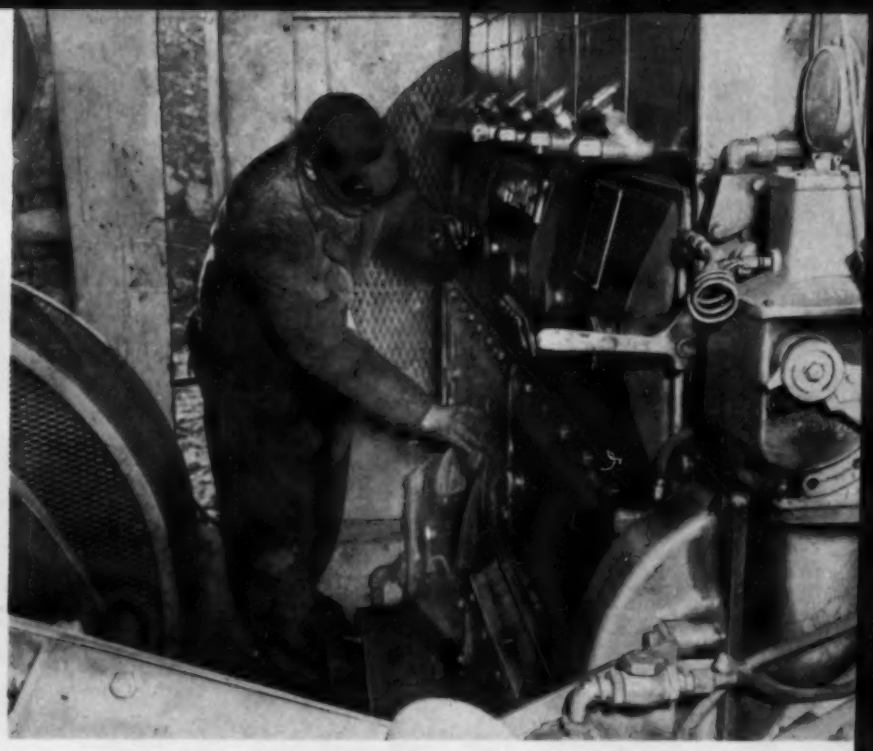
Rounding out a list of the company's major facilities are a picking and screening tipple and garage, shop and office accommodations in a service area that shows evidence of daily attention to good housekeeping.

The company is owned by Albert, Dom and Tony Teramana, three young brothers who got their start in the coal business by working in a family-owned deep mine while still in high school. In 1939 the Teramanas began operating a deep mine of their own, and in 1943 they branched out into stripping with a total list of equipment that included one small shovel and a truck. In the years since they have acquired reserves which point to long life ahead for the company. An account of present operations follows:

PREPARING OVERBURDEN

The cover on the numerous tracts worked by the company varies in

phases of operations at Teramana Bros. Coal Co., Steubenville, Ohio.



. . . ▲ More Power

SIX-CYLINDER DIESEL ENGINE provides adequate power to reduce need for "wide-open" operation. Lower maintenance costs are a major benefit.

Better Stripping

character. Tough shales and hard rock strata are encountered in some areas, although in others all overburden can be removed by the shovels without previous shooting.

Some overburden does require blasting, sometimes in three benches where cover is thick and hard and where limited shooting to avoid ground vibrations is called for. Vertical blastholes are sunk by a truck-mounted Varel drill. Normal practice is to drill 5½-in holes on 9-ft centers, sometimes in benches from 15 to 20 ft deep. Depth of the benches may be varied in order to have the blastholes terminate in a hard strata, thus providing an opportunity to concentrate the charge in the hard or tough rock.

When this method of bench shooting is employed, the stripping unit operates from the bench to clean up the broken material in preparation for the next round of drilling.

STRIPPING PRACTICES

The 4-yd Manitowoc 4500 is the newest unit in the Teramana lineup of excavators. The shovel is equipped with a 60-ft boom and 45-ft dipper stick to make it possible to handle 70-ft-thick cover economically. As a power unit for the shovel, the Teramanas selected a White Superior diesel engine having a continuous rating of 360 hp. This was done to have the engine operate at something less than maximum power in handling the normal demands of the job. The owners feel that "wide open" operation leads to higher costs for maintenance and downtime.

The 6-cylinder engine of vertical design has an open-chamber combustion system, permitting the exclusive use of non-premium fuel which further contributes to operating economy. The excavator and its power unit were selected for the sole purpose of reducing stripping costs to counterbalance unavoidable rising costs in other phases of operations. With the 4-yd machine moving about 400 cu yd per hr into the spoil area, the operators calculate a stripping cost about 20% lower than that prevailing before the new machine went into service. The 4500 now works two 10-hr shifts per day.

Cuts usually are 50 ft wide on the coal with the top of the seam providing a haulageway for the coal trucks. Normal practice is to work the cuts along the contours when conditions permit to take advantage of longer loading runs and to minimize the number of times the stripping and loading units must pass each other. Under certain circumstances, however, the company resorts to special methods.

For example, on inside curves spoil room is at a premium. In these conditions—and where the distance to the final highwall permits—successive cuts are driven perpendicular to the existing highwall, as previously mentioned. This is a retreat operation, in which the spoil from each new cut fills the previous cut after coal has been removed right up to the final highwall. Backfilling to cover the exposed coal under the final highwall is eliminated, and the only reclamation required is to shape the spoil peaks or take other steps outlined in the original lease. Additional spoil room is provided at the opening of each of these perpendicular cuts in the space remaining after coal is removed from the last long cut parallel to the contours. This method, which is applicable here since augering is not done, minimizes the need for rehandling spoil.

HAULING AND CLEANING

The haulage fleet consists of 13 International L-190 trucks of 14-ton capacity. These units haul from the

RAW COAL is dumped into 90-ton hoppers . . .

SCREENED and hand-picked over 70-ton bins . . .

LOADED into dealers' trucks for final distribution.

2-yd loading shovels to the picking and sizing tipple. Loading sites are separated, making it necessary to plan carefully in dispatching in order to keep the shovels and the trucks busy. An RCA two-way radio system is of great value in smoothing the problems of truck routing. The base station is at the office and mobile sets are installed in the pick-up trucks used by the Teramana brothers.

Some of the coal is hauled directly to industrial users in the Steubenville area. The remainder is run through the tipple and stored in bins to serve an extensive truck trade. Average output is 900 tpd.

Raw coal is dumped into either of two 90-ton hoppers. It is removed from the hoppers at a preset rate by two Syntron vibrating feeders which discharge onto a 30-in Hewitt-Robins elevating belt conveyor. The belt feeds a single-deck shaker, a portion of which serves as a picking table. Screen surfaces along the shaker drop out into 70-ton bins the stoker, nut, egg and lump sizes. Larger sizes may be diverted through a double-roll Scottdale crusher to increase the amount of stoker coal when demands are high. A double-chain conveyor under the shaker carries the diverted stream to the rolls.

PROVIDING MINE SERVICES

Pit drainage can be a major problem, especially during the wet seasons, and particularly acute at loading sites because of the natural sump created by the loading shovel and the surrounding spoil. This one is solved at Teramana operations by Jeep-mounted pumps constructed by W. F. Blake, master mechanic. Mr. Blake has mounted 4-in Jaeger pumps on each of three used Jeeps to provide high-capacity, portable pumps at a minimum investment. In making such a unit, the body of the Jeep is cut away at the rear and brackets are installed to receive the pump. A power takeoff from the transfer case of the Jeep drives the pump.

Coils of fire hose and the necessary tools for making connections are stored in the vehicles, and trailer hitches are welded on the front end of each Jeep to permit them to be hauled by pickup trucks or by other pump-Jeeps. In the latter instance, one man can take two of the pump units into the field for placement and starting. Using the Jeep engine as a drive unit for the pump has been found economical, and the added advantage of high mobility of the units further increases the benefits.

Another service unit of great value is a field-maintenance truck, also as-

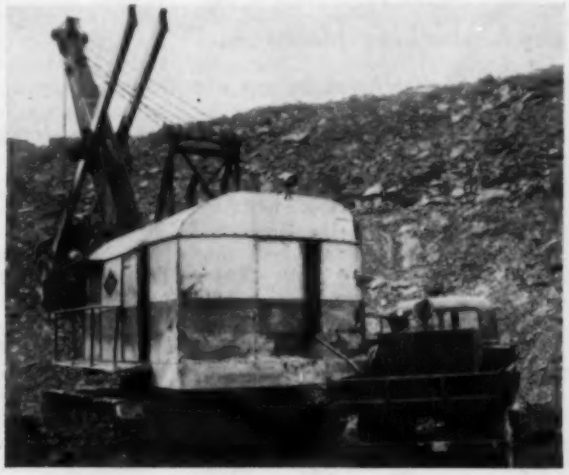
FLEET OF 14-TON TRUCKS hauls coal from 2-yd loading shovel. Haulage dispatching to separated loading sites is handled by two-way radio system. Coal is weighed on truck scale in neat service area shown in right photo.

sembled by Mr. Blake, which is equipped with oxy-acetylene and electric welding gear, air-powered tools and an air-compressor and a full complement of tools and bars. At the rear in the tailgate position is a workbench complete with vise, anvil blocks and other necessary auxiliaries. This truck makes it possible to make many major repairs in the field, without making frequent trips to the service area for tools and supplies.

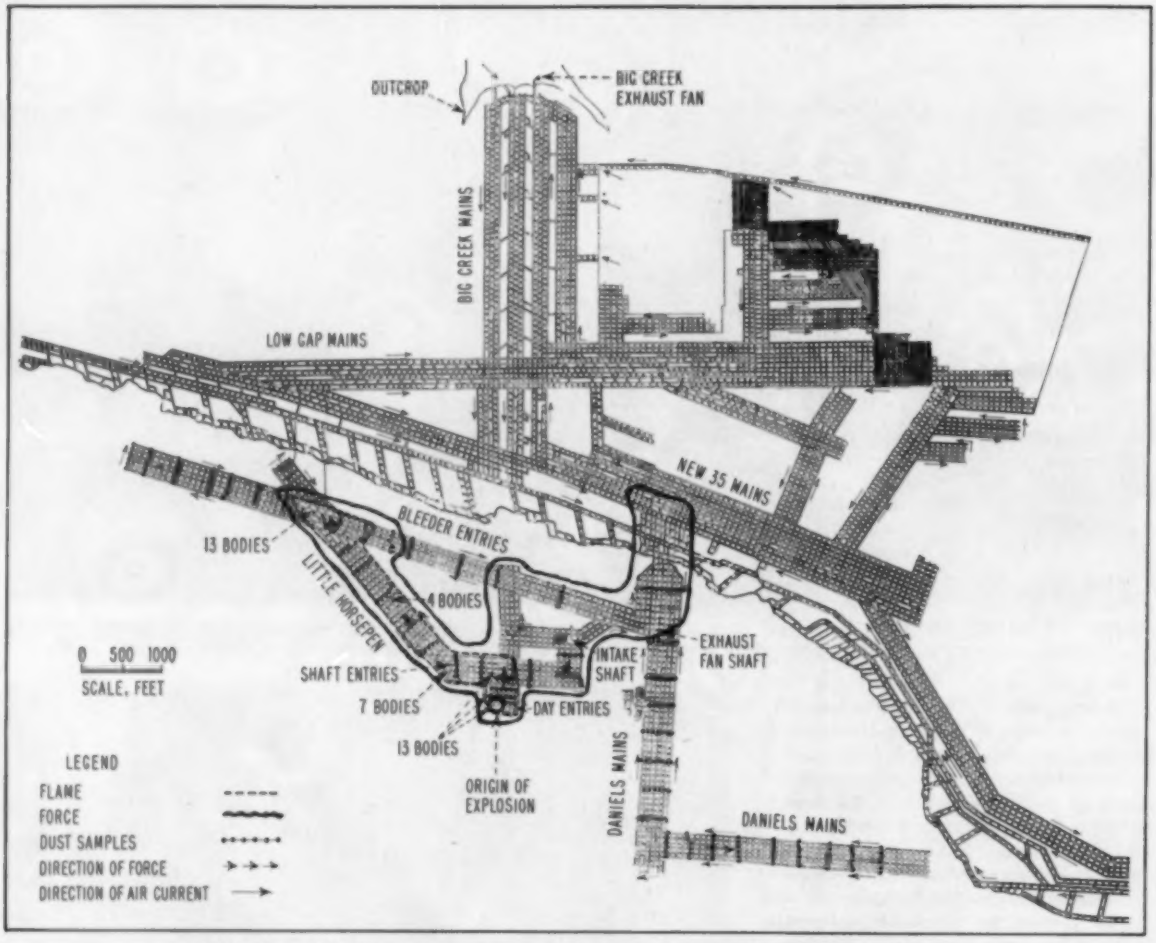
A fuel-and-lubricant truck regularly visits the field units to keep them in top operating condition. Other units include a TD-24, three D–8's and a D-7 bulldozer, which perform reclamation work, provide truck ramps, move spoil and clean the top of the coal and a Pettibone-Mulliken loader for handling stored coal.

TWO-YARD SHOVELS double as stripping units in shallower cover and as loading units when necessary. Overburden is prepared by a vertical drill.

CENTRIFUGAL PUMPS, integrally mounted on vehicles, make readily portable units for dewatering loading points.



SERVICE UNITS include this fuel truck and a fully-equipped shop truck which saves time in field repairs.



AFFECTED AREAS in the mine explosion which claimed the lives of 37 men

USBM reports causes and recommendations in

The Bishop Explosion

". . . caused by the ignition of an accumulation of gas in working places . . ."

". . . ignited by an electric arc or spark from one of four pieces of face electric equipment . . ."

AT 1:55 A. M. (EST,) Feb. 4, 1957, it happened again. The men in another U. S. coal mine took the ultimate violence of an underground explosion. Later in the day, the toll at No. 34 mine, Pocahontas Fuel Co., Inc., Bishop, Va., was announced: 37 of the 178 men in the mine at the time of the explosion had lost their lives, 13 of the dead having succumbed to afterdamp.

The victims left behind a total of 152 dependents. The disaster is the worst in a U. S. mine since 119 men died at Orient No. 2, West Frankfort, Ill., Dec. 21, 1951.

The Bishop workings, lying under the Virginia-West Virginia border, produced 2,105,822 tons in 1956, making the mine the ninth largest in the country in terms of tonnage produced, according to *Keystone Coal Buyers Manual*, a *Coal Age* affiliate. The mine has been in operation since 1927.

Concerning safety performance at Bishop, records show that in the first 9 mo of 1956 production was 1,580,223 tons, and in this period two fatalities and 103 nonfatal accidents were reported. Three previous explosions at the property in 1937 and 1951 caused a total of five fatalities. Federal coal-mine inspection reports for April, August and November, 1956, show that methane was liberated from the workings at calculated rates of 4,348,655 cu ft per 24 hr, 2,846,016 cu ft per 24 hr and 3,069,936 cu ft per 24 hr, respectively. Four axial-flow fans circulated approximately 941,300 cfm of fresh air through the mine.

What contributing factors led to the catastrophe at Bishop? What steps can be taken to prevent recurrences at other mines? The official report of the U. S. Bureau of Mines, written by investigators who were on the scene shortly after the explosion occurred, provides clues from which the answers to these questions might be derived.

MAJOR FINDINGS

The following excerpts from the official report tell what the investigators found:

Point of origin:

"The consensus of the Bureau of Mines investigators is that the explosion originated at or near the faces of Nos. 9, 10 and 11 entries being driven off, or at or near the face of No. 1 entry of, the Day headings." [See accompanying mine map —Ed.]

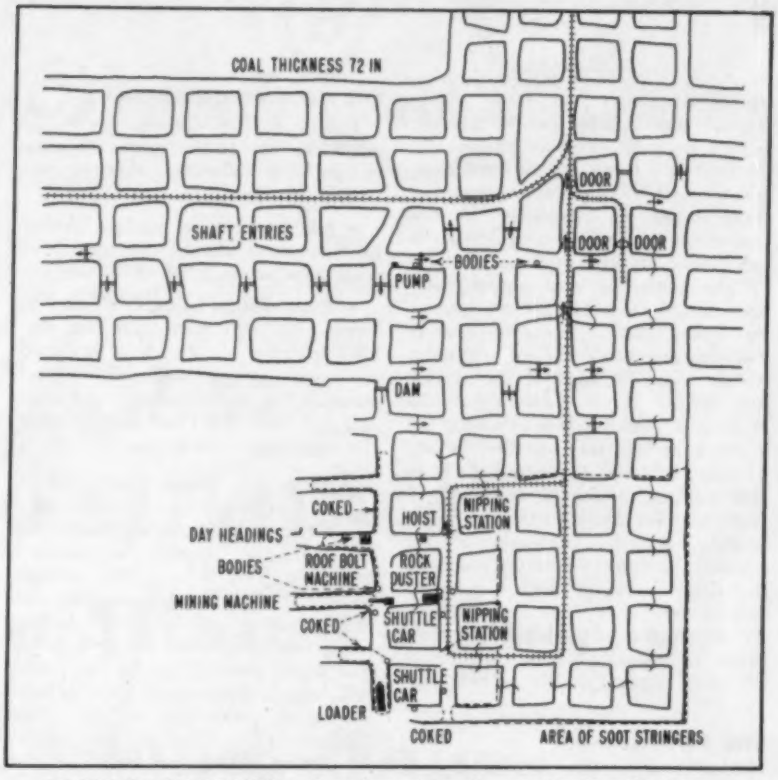
Cause of the explosion:

"The federal investigators are of the opinion that the disaster was caused by the ignition of an accumulation of gas in working places being driven in or off the Day headings. Gas had accumulated in these places as a result of short-circuiting of the ventilating current, which was due to airlock doors at the entrance to the working section having been left open. The gas was ignited by an electric arc or spark from one of four pieces of face electric equipment, from the trailing cables to this equipment, or at the inby nipping station for part of this equipment. Coal dust in the immediate face areas entered into the explosion and aided in its propagation. When flame and forces of the explosion reached the Shaft headings, the explosion was further propagated by mine dust (mixed coal and rock dust) that was rendered explosive by the presence of gas that had been liberated in the Nos. 5 and 6 entries of those headings during the ventilation failure."

Factors limiting further propagation:

". . . Forces of the explosion extended throughout the Day headings, into and throughout the Shaft headings, east and north to the surface through the man shaft, west into and throughout the Little Horse Pen entries and into and east and west in the Bleeder entries. Forces subsided rapidly as they spread east and west in the Bleeder entries, and forces moving east through the Shaft entries diminished quickly when they reached the man shaft. Evidence of flame was not observed in the Shaft headings east of the Day headings or in the Bleeder entries, except near the junction of these entries and the Little Horse Pen entries.

"The diluting and quenching effect of the rock dust applied was the principal factor in preventing further spread of this explosion. Other factors acting in combination that helped limit the explosion were: the cooling effect of the extensive rib, roof and floor surfaces of the numerous entries in the path of the explosion; and ample open areas, including the man shaft, for expansion of forces, resulting in a reduction of flame speed and temperature."



ORIGIN OF EXPLOSION and equipment locations in the Day headings

Permissibility:

". . . The electric face equipment was frame-grounded, was of permissible type, and was in permissible condition at the close of the November, 1956, inspection. . . ."

"The company safety inspector examined the electric face equipment in the Day headings on Friday, Feb. 1, and found the equipment in permissible condition, except that an opening in excess of 0.004 in was present in a compartment on No. 27 shuttle car. The condition was corrected immediately. However, none of the face electric equipment in the Day headings was in permissible condition when examined by federal electrical inspectors after the explosion. Four pieces of this equipment had major permissibility deficiencies, any one of which could have ignited an explosive mixture of methane. The gland at the pump motor on the loading machine needed packing, and the trailing cable for this machine contained seven temporary splices, one of them 8 ft from the machine.

"Substandard conditions noted in the shuttle car that was under the boom of the loading machine included a bare splice in the Miller plug connection, two openings of more than 0.005 in in the forward-motion foot-button enclosure, another such opening between the contactor box and its cover, cable entrance glands on the headlight resistor and pump motor needed packing, three hose conduits were broken, the trailing cable was pulled apart at the splice and the right front wheel of the mining machine was on the cable.

"The rear headlight lens on the Jeffrey mining machine was loose, an open circuit was in the power conductor in this headlight, the headlight and two control fuse holders were bridged, one of the bridge wires across the headlight fuse holders was burned in two, a bare splice was in the lead from the contactor compartment to the reel collector ring, and the hose conduit on this lead was broken. There was an opening in excess of 0.005 in in the contactor enclosure of the roof-bolting machine, the hose conduit at the packing gland for the rear headlight was too short, there was no packing in this gland, and the trailing cable was pulled apart at two bad splices. . . .

"It will never be known whether the trailing cables on the roof-bolting machine and the shuttle car were pulled apart prior to or after the explosion, but it is certain that arcing or sparking at the splices could have ignited explosive methane. It will further never be known if any of the other foregoing permissibility deficiencies on the face electric

equipment, such as, loose leads through insufficiently packed glands, existed prior to or were caused by the heat and forces of the explosion. However, it is our opinion that the above types of deficiencies in the equipment in the Day headings were not caused by the explosion.

"The outby of two nipping stations for the face electric equipment was about 180 ft from the nearest working face, and the inby nipping station near the end of the trolley wire in No. 11 entry was about 130 ft from a working face. Reportedly, a check curtain was installed in No. 11 entry to direct the return air from the working places to the No. 12 entry without flowing directly by the nipping station. Certainly if air coursed through the working places in the Day headings had not been checked effectively and directed into No. 12 entry inby the nipping station, explosive methane in such air could be easily ignited at the nipping station."

THE EVIDENCE

The investigators reached these conclusions based on the following evidence:

Reports of fireboss examinations show no unusual conditions in the several hours prior to the explosion, although the fireboss assigned to the Day headings had "dangered off" one or more working places in these headings on 16 different days during the month prior to the explosion.

The Day and Shaft headings were ventilated from a single split of air. Part of the intake air traveling in the Shaft entries moved through the Little Horse Pen entries and entered the intake airways of the Bleeder entries.

This split was controlled by airlock doors at the entrance to the Day headings. Evidences of a large quantity of gas having burned in the face areas of the Day headings proves unquestionably that gas had accumulated here, the report says, and this accumulation could have occurred only as a result of short-circuiting the air from these places. The most logical explanation for the short-circuiting is that the airlock doors at the entrance to the section were open for some time before the explosion.

Ten brattice-cloth stoppings and six check curtains were used to direct and control the ventilating current in the Day headings. The investigators also reported that dust accumulations were observed inby the loading points but that open areas outby the loading points were generally well rockdusted.

THE RECOMMENDATIONS

Following their examination of the evidence, the investigators recommended the following steps to prevent a recurrence:

- **Each mechanical loading section** at this mine should be ventilated with a separate split of intake air.

- **Each section being developed in virgin coal** with more than four parallel entries should be ventilated with a current of intake air coursed through the center entries, split right and left near the face, and returned through the outside entries.

- **Preferably, doors should not be used** to control the main ventilating current of an air split. If doors must be used, they should be installed in pairs to form airlocks large enough to contain an entire trip, so arranged that one door will be closed before the other is opened, so constructed that a trip passing in either direction will engage bumpers designed to hold the doors open, and so hung that they will close when not held open. No means should be provided for fastening the doors in the open position.

- **Stoppings in crosscuts** between intake and return airways should be built of solid substantial material, preferably incombustible material. Not more than two temporary stoppings should be permitted between permanent stoppings and the last open crosscuts.

- **Nipping stations** should be kept in intake air.

- **Electrical equipment** should be kept in permissible condition.

- **Trailing-cable splices** should be well insulated, and it should be established that cables containing a fixed number of temporary splices be removed from service until such splices have been vulcanized.

- **Check curtains and line brattice** should be installed and maintained to minimize the possibility of methane accumulations in face areas.

- **Examinations for gas** should be made at the face at sufficiently frequent intervals to insure detection before accumulations reach dangerous proportions.

- **Foremen should record clearly,** in the daily report book provided for that purpose, the location and nature of any danger observed by them or reported to them during the working shifts. The report should show what action, if any, was taken by them to remedy the danger and should also include any action taken to correct hazards reported by firebosses. Frequent reporting of gas in an area should be investigated by higher officials and remedial action should be taken immediately.

- **Coal dust and loose coal** should not be permitted to accumulate in dangerous quantities in any active underground workings. Rock dust should be distributed uniformly on roof, ribs, and floor in such quantity that the incombustible content of the coal dust, rock dust and other dust will not be less than 65%, plus 1% for each 0.1% of methane in the ventilating current. A program for adequate rockdusting in the face regions should be adopted and put into effect immediately.

- **Dust samples should be collected** and analyzed periodically to determine the effectiveness of rockdust applications.

- **A self-rescuer should be provided** for each person underground, who should be instructed as to its safe maintenance, use and limitations.

- **All underground personnel** should be instructed in procedures that should be instructed as to its safe a disaster underground. The instruction should include adequate information on barricading, especially information on when, where and how to erect barricades.

In expansion of the last recommendation, the report points out that the 13-man crew working at the faces of the Bleeder entries began to walk out to the manshaft after the concussion and power failure. Their working places were not affected by the explosion. Apparently they walked directly into the fumes of the explosion and died near the Little Horse Pen intersection, about 3,000 ft from their working places at the Bleeder-entry faces. It is entirely possible, the report says, that these men might have lived without erecting barricades if they had remained in the face regions of the Bleeder entries until rescued. If these victims had erected barricades and stayed behind them, there is little doubt that they would have been saved. Ventilation to the Bleeder faces had been reestablished by 5:30 pm, Feb. 4, and examination of the area turned up three flame safety lamps, still burning.

The hazard of mine explosions exists today. The only solution is to eliminate from each property any conditions which could conceivably lead to ignitions and propagation. Events at Bishop should generate a reappraisal of conditions at every coal mine in the country.

★ ★ ★ *NEW HORIZONS FOR COAL* ★ ★ ★

Preview . . .

1957 COAL SHOW American Mining Congress Cleveland, Ohio May 13-16

The Coal Show Program . . . . . p 101

Nine sessions covering continuous mining, conventional mining, strip mining, coal preparation, management and safety

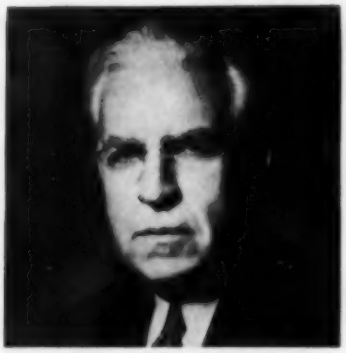
The Coal Show Exhibits . . . . . p 102

A complete listing of all products and services scheduled for showing at Cleveland

New Products at the Coal Show . . . p 110

A special section providing descriptions and illustrations of the bulk of the new equipment and materials to be exhibited at the 1957 AMC Coal Show

A. R. Matthews
President, Pittsburgh Consolidation Coal Co.
National Chairman, Program Committee



L. C. Campbell
Vice President, Eastern Gas & Fuel Associates
Chairman, Coal Division

J. E. M. Wilson
Vice President, Jeffrey Mfg. Co.
Chairman, Manufacturers Division, American Mining Congress

Your Coal-Show Invitation

FOUR GREAT DAYS await you at the American Mining Congress Coal Show. Make your plans now, if you haven't already done so, to see it in Cleveland May 13-16.

The Nation's leading manufacturers and suppliers are going all out to bring you a complete showing of the latest developments in mining machinery, equipment and materials. Nowhere else can you see and study such a vast array of modern mining essentials. At the Coal Show they are assembled for your convenient inspection and comparison. You can check and double-check—and discuss their application and performance with the exhibitors' own mining men and technical specialists. All in all the exhibits at this national Coal Show offer you a golden opportunity.

A timely program of practical operating discussions has been arranged to bring you an across-the-board review of modern coal mining, including preparation, safety and management. Men experienced in each phase of mining and related operations will lead the discussion—aimed at coming up with "how" and "why" solutions to each production, preparation, safety and management problem. You will find these convention sessions pointed, practical and interesting. You are invited to join in, ask questions and contribute from your own experience. Anyone wishing to discuss one of the program subjects will be furnished a copy of the paper and his name given to the chairman.

The 1957 Coal Show will focus the country's attention on coal-mining progress. Join the trek to Cleveland May 13-16 to keep abreast of the times in this fast-moving industry. The American Mining Congress invites you.

See and hear all about the "New Horizons for Coal."

The 1957 Program Committee

A. R. Matthews, Pittsburgh Consolidation Coal Co. (Chairman)
I. N. Bayless, Union Pacific Coal Co.
R. K. Beacham, Ayrshire Collieries Corp.
C. R. Boll, Cummins Engine Co., Inc.
A. P. Boxley, Eastern Gas & Fuel Associates
N. T. Camicia, Island Creek Coal Co.
S. Austin Caperton, Slab Fork Coal Co.
E. C. Carris, Consulting Engineer
E. R. Cooper, Jones & Laughlin Steel Co.
C. C. Cornelius, Joanne Coal Co.
W. J. Crawford, Enos Coal Mining Co.
William Crawford, Powellton Coal Co.
E. E. Criswell, Compass Coal Co.
C. M. Donahue, Mine Safety Appliances Co.
W. Stuart Emmons, Hulburt Oil & Grease Co.
W. A. Gallagher, Stonega Coke & Coal Co.
Theron G. Gerow, Mining Consultant
D. N. Griffin, Deister Concentrator Co.
C. M. Guthrie, Peabody Coal Co.
R. G. Heers, Kaiser Steel Corp.
D. K. Heiple, LeTourneau-Westinghouse Co.
James H. Hyslop, Hanna Coal Co.
David Ingle, Ingle Coal Co.
W. C. Jones, Jeddo-Highland Coal Co.
J. M. Kerr, Berwind-White Coal Mining Co.
R. L. Killebrew, Westinghouse Electric Corp.
A. E. Lamm, Sunnyhill Coal Co.
Arthur S. Macke, Mid-Continent Coal Corp.
H. E. Mauck, Olga Coal Co.
W. L. McMorris, Coal Div., U. S. Steel Corp.
L. O. Millard, Link-Belt Co.
M. D. Millard, American Steel & Wire Div.
W. D. Moreman, Sanford-Day Iron Works, Inc.
E. M. Pace, Inland Steel Co.
Moss Patterson, West Kentucky Coal Co.
C. B. Peck, Anaconda Wire & Cable Co.
W. B. Petzold, The Hudson Coal Co.
Adrian W. Rich, Fairmont Machinery Co.
H. C. Rose, Pittsburgh Coal Co.
S. F. Sherwood, Stonefort Corp.
M. A. Shoffner, Freebrook Corp.
H. H. Smith, National Malleable & Steel Castings Co.
R. B. Warren, Goodyear Tire & Rubber Co.
W. L. Wearly, Joy Mfg. Co.
R. R. Williams Jr., Colorado Fuel & Iron Corp.
Robert E. Young, Harnischfeger Corp.

1957 Convention Program

MONDAY MORNING, MAY 13

Continuous Mining

Maintenance of Continuous-Mining Equipment—J. H. Sherrard Jr., Chief Engineer, Johnstown Coal & Coke Co.

Design of a Power Installation for a Continuous Operation — W. C. Wright, Superintendent of Maintenance, Kaiser Steel Corp.

Roof Support Without Interrupting Continuous Loading — Benjamin Tudor, Mining Engineer, Clinchfield Coal Corp.

Current Roof-Support Practices With Continuous Mining—R. D. Joseph, Mining Engineer, and E. M. Thomas, Mining Engineer, Roof Control, U. S. Bureau of Mines.

TUESDAY MORNING, MAY 14

Conventional Mining

Mechanical Mining in Thin Seams—R. M. Johnson, Manager, Rockhouse Div., Island Creek Coal Co.

Underground Rail-Haulage Systems—Large-Capacity Mine Cars—John R. Palin, Chief Engineer, Harmar Coal Co.

Underground Rail-Haulage Systems—High-Speed Operation—C. S. Winters, Superintendent, Powhatan Mining Co.

All-Belt Haulage and AC Power Underground — Courtney Quirey, Superintendent, Pittsburg & Midway Coal Mining Co.

Maintenance—A Tool for Increased Production—C. N. Van Houten, Superintendent of Maintenance, Tennessee Coal, Iron & R.R. Div., U. S. Steel Corp.

TUESDAY MORNING, MAY 14

Coal Preparation

Water Clarification—Recovering Fine Coal of Commercial Value—E. M. Robinson, Preparation Superintendent, Jeddo-Highland Coal Co., Jeddo, Pa.; Wm. C. McCulloch, Coal Preparation Manager, Roberts & Schaefer Co.

Water Clarification—Conserving Water for Re-Use—P. L. Richards, Manager, Coal Preparation, and John C. Durfree, Superintendent, Robena Plant, Coal Div., U. S. Steel.

Water Clarification — Preventing Stream Pollution—Henry F. Hebley, Research Consultant, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa.; Larry Cook, Executive Vice President, Ohio Reclamation Association.

TUESDAY AFTERNOON, MAY 14

Strip Mining

Drilling and Blasting Overburden With Ammonium-Nitrate Explosives—Fred Horne, Explosives Engineer, Peabody Coal Co.

Drilling and Blasting Overburden With Liquid Oxygen—C. C. Woolsey, Drilling & Shooting Superintendent, Enos Coal Mining Co., Oakland City, Ind.; D. W. Mogg, Project Supervisor, Great Lakes Carbon Co.

Overburden Removal—Large Shovel Operations—T. G. Gerow, Mining Consultant and Engineer.

Overburden Removal—Medium- and Small-Shovel Operations — R. E. Dougherty, Vice President, Operations, Tasa Coal Co.

Overburden Removal—Tractors and Scrapers—Harry H. Hughes, General Superintendent, J. Robert Bazley, Inc.

WEDNESDAY MORNING—MAY 15

Conventional Mining

Majors Factors in Belt-Conveyor Haulage—J. W. Bassett, Mining Engineer, West Kentucky Coal Co., Madisonville, Ky.; Robert E. Spoerl, Chief Belting Engineer, U. S. Rubber Co.

A Shop School for Maintenance Instruction—W. C. Schott, Vice President, Stonega Coke & Coal Co.

Special Problems in AC for Underground Power—C. C. Conway, Electrical Engineer, Clarkson Mfg. Co.

Core Drilling for Air Shafts and Manways—D. C. Ridenour, Chief Engineer, Olga Coal Co.

WEDNESDAY MORNING—MAY 15

Strip Mining

Portable Power Systems for Strip Mining—L. E. Briscoe, Electrical Engineer, Ayrshire Collieries Corp., Indianapolis, Ind.; B. E. Rector, Manager, Mining Engineering Dept., Westinghouse Electric Corp.

An Engineering Approach to Rehabilitation of Large Castings—R. L. Rectenwald, President, Maintenance Engineering Corp.

Rope Life Extended by Maintenance and Proper Use—B. N. Carlson, Chief Wire Rope Engineer, American Steel & Wire Div., U. S. Steel.

New Maintenance Ideas—Emil Sandeen, Mine Superintendent, Pittsburg & Midway Coal Mining Co.

WEDNESDAY AFTERNOON, MAY 15

Management, Safety

Mine Fire Hazards and Fire-Fighting Equipment—J. F. Whittaker, General Supt., Pittsburgh Coal Co.

United Mine Workers' Role in Accident Prevention—C. B. Ferguson, Director, Safety Div., United Mine Workers of America.

Personnel Evaluation and Training—C. R. Nailler, President, Christopher Coal Co.

Cost Controls Through Industrial Engineering—G. W. Lockin, Industrial Engineer.

THURSDAY MORNING, MAY 16

Continuous Mining

Service Haulage for Continuous Mining—Belt-Turning Device—W. G. Kegel, Assistant Master Mechanic, Vesta-Shannopin Div., Jones & Laughlin Steel Corp.

Service Haulage for Continuous Mining—Bridge, Chain and Belt Conveyors—Gordon A. George, Superintendent, Wyatt Seanor Coal Co.

Service Haulage for Continuous Mining — Shuttle Cars — Michael M. O'Brien, Assistant Superintendent, Pocahontas Fuel Co., Inc.

Mining in Various Seam Conditions—Ray M. Biggs, Electrical Engineer, Viking Coal Corp., Terre Haute, Ind.; William Laird, Superintendent, Eastern Gas & Fuel Associates.

THURSDAY MORNING, MAY 16

Coal Preparation

Modern Cleaning-Plant Design—Loy A. Updegraff, Project Engineer, Bituminous Coal Research, Inc.; Jack M. Bishop, Chief Chemist, Truax-Traer Coal Co.

Coal Drying and Dust Collection—A. P. Massman, Coal Preparation Manager, Peabody Coal Co.

Coal Cleaning With the Feldspar Jig—E. R. McMillan, Manager, Coal Operations, Northwestern Improvement Co.

The Twin-Deck Suspension-Type Coal-Washing Table—F. S. Ambrose, Construction Engineer, Fairmont Machinery Co., Fairmont, W. Va.; D.H. Davis, Vice President, Mathies Coal Co.

SPECIAL EVENTS

Coal Miners Party—Wednesday evening, Carter and Statler Hotels.

The Coal Show Exhibits . . .

Equipment . . . Materials . . . Services

This check list of what manufacturers will show at Cleveland is prepared to give you a complete rundown of products and services. The listings are classified for convenience in locating products in which you may be particularly interested, saving you time and footwork later.

New products are especially indicated in the check lists. A full description when provided, of each of these new products appears in a special section of this American Mining Congress Coal Show Preview, beginning on p 110. It, too, is designed to help you get more out of your time at Cleveland.

Loading Machines

Goodman Mfg. Co., Chicago 9, Ill.—Low-vein loading machine.

Joy Mfg. Co., Pittsburgh 23, Pa. Joy loading machines, including low-vein types.

Long Co., Oak Hill, W. Va.—Model 88C low-height Pigloader and auxiliaries.

Myers-Whaley Co., Knoxville 1, Tenn.—"Whaley Automat" loading machines, both track and crawler mounted.

Continuous Miners, Bits and Accessories

Cincinnati Mine Machinery Co., Cincinnati 25, Ohio—NEW—Cutter chains for all types of continuous miners; holders for taper-shank carbide bits for the Jeffrey, Goodman and Joy continuous-mining machines.

Clarkson Mfg. Co., Nashville, Ill.—440-v AC Marietta continuous miner.

Compton, Inc., Clarksburg, W. Va.—NEW—Maximum flexibility underground mining machine able to mine coal as thin as 28 in.

Firth Sterling, Inc., Pittsburgh 30, Pa.—NEW—Heavy-duty CMC bit for boring-type miners.

Goodman Mfg. Co., Chicago 9, Ill.—Type 400 continuous borer for 6- to 7½-ft coal; Wilcox auger miner.

NEW—Type 300 continuous borer for lower coal measures.

Irwin Foundry & Mine Car Co., Irwin, Pa.—Huwood-Irwin longwall slicer.

Jeffrey Mfg. Co., Columbus 16, Ohio—Type 76-AM Colmol with mining width of 9 ft 8 in, 40 to 52-in coal; Type 76-CM Colmol, 10-ft 9¾-in width, 67- to 96-in coal; Type 76-B Colmol, 9-ft 8-in width, 46½- to 64-in coal.

NEW—Type 86-A Colmol with a mining width of 14 ft 7 in for seams from 28 to 44 in arranged to discharge into bridge conveyor delivering to pan conveyor.

Joy Mfg. Co., Pittsburgh 23, Pa.—Ripper and fullface continuous miners for high and low coal, with emphasis on the 5-tpm 5-CM unit for medium-low coal.

Kennametal, Inc., Bedford, Pa.—NEW—U7T taper-shank bit for boring-type miners.

Lee-Norse Co., Charleroi, Pa.—Model CM33X Lee-Norse miner.

NEW—Model LCM-26 "Low-Coal" Lee-Norse miner.

Metallurgical Products Dept., General Electric Co., Detroit 32, Mich.—Carboloy tools for continuous miners.

NEW—CC-8 negative rake bit for continuous miners.

Mining Progress, Inc., Highland Mills, N. Y.—Westfalia Lunen Lobbe Hobel, or planer—"The original truly continuous mining machine."

Frank Prox Co., Inc., Terre Haute, Ind.—Miner bits; chains, bars and sprockets for Marietta and Goodman miners.

NEW—JCM-1 miner chains.

Vascoloy-Ramet Corp, Waukegan, Ill.—Continuous-miner bits.

NEW—CML bit for boring-type machines.

Wilcox Mfg. Co., Raleigh, W. Va.—Wilcox auger miner.

Allied Steel & Tractor Products, Inc., Cleveland 5, Ohio—Quarrying and mining tools.

Stripping

American Cyanamid Co., New York 20, N. Y.—Explosives, detonators and other blasting supplies.

NEW—Cyanamite and Accomite blasting agents.

Atlas Powder Co., Wilmington 99, Del.—Ammonium-nitrate blasting agents; Atlas Manasite and Rockmaster electric blasting caps; Rockmaster millisecond-delay blasting techniques; complete Atlas line of cartridge styles, blasting supplies and accessories.

NEW—Atlas Granules, or ammonium-nitrate blasting agent.

Austin Powder Co., Cleveland 13, Ohio—Stripping augers and bits; detonating fuse and explosives.

Baldwin-Lima-Hamilton Corp., Lima, Ohio—Stripping shovels.

NEW—Lima 1250 shovel.

Bucyrus-Erie Co., S. Milwaukee, Wis.—Quarry and mining machines.

NEW — Dragline buckets, including 32-cu yd unit.

Cardox Corp., Chicago 1 ,Ill.—General-purpose drill for truck mounting; heavy-duty horizontal blasthole drill.

Davey Compressor Co., Kent, Ohio—Chassis-mounted overburden drill.

NEW—Model M8ALT Air Blast tractor-mounted rotary drill with hydraulic levelling jacks and 26-ft kelly for 20-ft drill change.

E. I. du Pont de Nemours & Co. Wilmington 98, Del. — NEW — Overburden blasting agents.

Electric Steel Foundry Co., Portland

10, Ore.—Tapered dragline bucket featuring new 60-in flat lip.

New —4-cu yd all-cast shovel dipper.

Firth Sterling, Inc., Pittsburgh 30, Pa. —Finger bits; drill-bit inserts.

Harnischfeger Corp., Milwaukee 36, Wis.—Electronically controlled excavators; P & H Magnetorque units; main drum assembly of P & H 955A excavator.

Hendrix Mfg. Co., Mansfield, La.—Hendrix dragline buckets, including Type "MH" heavy-duty units in popular sizes and featuring 14% cast-manganese-steel lip, chains and fastenings.

Hercules Powder Co., Wilmington, Del. —Explosives and blasting supplies, including blasting agents in steel containers.

Kennametal, Inc., Bedford, Pa.—Kennametal tungsten-carbide drilling tools.

Koehring Co., Milwaukee, Wis.—Stripping shovels and other excavators used in coal mining.

NEW—Model 1205 3-cu yd and Model 305 ¾-cu yd excavators.

LeTourneau-Westinghouse Co., Peoria, Ill.—Tournapulls, Tournadozers and other earth-moving equipment.

NEW—Model C Fullpak scraper; Model 66 POWER-Flo motor grader.

Manitowoc Engineering Corp., Manitowoc, Wis.—Manitowoc stripping equipment.

Metallurgical Products Dept., General Electric Co., Detroit 32, Mich.—Rock-drilling bits and carbide mining tools, including exploratory and large rotary geophysical bit with Carboloy cemented-carbide inserts.

Marion Power Shovel Co., Marion, Ohio—Stripping and loading shovels and draglines, featuring Type 5760 shovels with capacities of 60 to 75 cu yd.

McLaughlin Mfg. Co., Inc., Joliet, Ill. —Overburden augers, bits and heads.

Olin Mathieson Chemical Corp., Explosives Div. E. Alton, Ill.—Olin dynamites and blasting caps.

Page Engineering Co., Chicago 38, Ill.—The Automatic dragline bucket, featuring a 7-cu yd completely fitted unit of new "T" steel permitting larger-capacity buckets within the same weight limitations.

Reich Bros. Mfg. Co., Tere Haute, Ind.—NEW—Truck-mounted version of the Model 750 crawler-mounted blast-hole rig featured in *Coal Age*, February, 1957.

Salem Tool Co., Canton, Ohio—McCarthy Model 106-24 heavy-duty vertical auger drill; McCarthy horizontal high-wall drills, both truck-mounted and self-propelled; also augers and drill heads and auger-drilling machines.

NEW—Heavy-duty horizontal high-wall auger.

Schramm, Inc., West Chester, Pa.—125-cfm self-propelled air compressor with 7-ft steel rotary brush and 2⅝-in drifter.

Spencer Chemical Co., Kansas City, Mo.—"Prilled ammonium nitrate for lowering blasting costs," including preparation and use of field-compounded explosives involving the product.

Stardrill-Keystone Co., Beaver Falls, Pa.—NEW—All-air rotary drilling.

Varel Mfg. Co., Dallas, Tex.—Rotary rock bits; diamond bits.

Vascoloy-Ramet Corp., Waukegan, Ill. —Drilling tools.

NEW—Pilot head for drilling overburden.

Winter Weiss Co., Denver 5, Colo.—Integral unit rotary drill for mounting on Caterpillar D6 tractor.

Auger Mining

Cardox Corp., Chicago 1, Ill.—Cardox auger miner.

Compton, Inc., Clarksburg, W. Va.—Coal-recovery machines with special provisions for increasing the percentage of coal recovery in augering.

Salem Tool Co., Canton, Ohio—McCarthy Models 1000, 1400 and 2400 coal-recovery drills, featuring the Model 1442-36 McCarthy coal recovery drill equipped with hydraulically operated moving skids, hydraulic corner jacks, boom, hoist and swing, safety guide and auxiliary conveyor.

Coal Preparation

Allen - Sherman - Hoff Pump Co., Wynnewood, Pa.—Hydroseal and Centriseal interchangeable slurry pumps for pumping abrasive and/or corrosive fluid-solids mixtures. The Centriseal, requiring no gland water, and the Hydroseal are totally lined for longer life with easily replaceable rubber or synthetic parts. Alloys may be obtained for use around the stuffing box.

American Air Filter Co., Inc., Louisville 8, Ky.—AAF Amerclone dry centrifugal dust collector for high concentrations of dry granular particles in large volumes; Type N Roto-Clone for heavy-duty loadings of all sizes—"simple, efficient and less costly to maintain"; Type W Roto-Clone for medium concentrations of fine particles—"lowest-price high-efficiency wet dust collector in its class."

Allis-Chalmers Mfg. Co., Industries Group, Milwaukee 1, Wis.—Screens for coal preparation.

Ashland Oil & Refining Co., Ashland, Ky.—Permatreat coal spray.

Barber-Greene Co., Aurora, Ill.—NEW —"Duo-Screen" developed in Germany.

Colorado Steel & Iron Corp., Wickwire Spencer Steel Div., New York 22, N. Y.—Wisscoloy and Super-Tempered precision screens.

Bird Machine Co., S. Walpole, Mass. —NEW—Bird-Humboldt oscillating centrifugal dryer.

Bixby-Zimmer Engineering Co., Galesburg, Ill.—NEW—Iso Rod and B-H Loop screens for dewatering and the screening of high-moisture raw coal.

Buttner Works, Inc., New York, 17, N. Y.—Flash and drum dryers; dust-collecting equipment.

Centrifugal & Mechanical Industries, Inc., St. Louis 18, Mo.—C-M-I Model EB 36-in continuous centrifugal dryer with several improvements field-tested in the past year.

Cleveland Vibrator Co., Cleveland, Ohio—Bin vibrators.

NEW—Air-power vibratory feeders able to handle material beyond the abilities of conventional units.

Combustion Engineering, Inc., Raymond Div.,—Chicago, Ill.—C-E Raymond flash-drying system, particularly as applied at the pipeline terminal at the Eastlake plant of the Cleveland Electric Illuminating Co.

Deister Concentrator Co., Ft. Wayne 1, Ind.—Concenco "77" Diagonal-Deck coal-washing table with double capacity.

Denver Equipment Co., Denver 17, Colo.—Coarse-coal flotation in a new simplified flowsheet; water-clarification units.

NEW—9-ft disc-filter segment.

Dorr-Oliver, Inc., Stamford, Conn.—Dorrco FluoSolids system for fine-coal drying and complete line of Dorr-Oliver equipment for the fines circuits of coal-cleaning plants—thickeners, filters, classifiers and pumps.

Fairmont Machinery Co., Fairmont, W. Va.—Chance sand-flotation coal cleaning; Fairmont preparation services as epitomized in the new Loveridge plant of the Jamison Coal & Coke Co.

Fuel Process Co., Charleston, W. Va. —NEW—Heavy-media washer.

B. F. Goodrich Industrial Products Co., Akron, Ohio—Rotor and stater for Fagergren flotation machine.

Goyne Pump Co., Ashland, Pa.—Standard solids-handling pump; high-head pump for disposal service and feeding cyclones; Ni-Hard pump parts.

T. J. Gundlach Machine Co., Div. J. M. J. Industries, Inc., Belleville, Ill.—Model 56 DA two-stage double-adjustable crusher capable of crushing up to 400 tph or more. Crusher and 60-hp motor normally required will be driven by ¼-hp normal-starting torque motor under no-load condition to show low frictional drag.

Hendrick Mfg. Co., Carbondale, Pa.—Perforated screen metals of all types; flanged lip screens; and Hendrick Wedge Slot and Wedge Wire screens.

Hewitt-Robins, Inc., Stamford, Conn. —Eliptex vibrating screens; Robintronic level controls.

Heyl & Patterson, Inc., Pittsburgh 22, Pa.—H & P fine-coal washing and water-clarifications circuit, featuring fine-coal washer, cyclones with new replaceable liners, and a fine-coal centrifuge.

Robert Holmes & Bros., Inc., Danville, Ill.—Holmes lowering spirals; Holmes car-handling equipment; Holmes laboratory crushers and pulverizers; other Holmes preparation equipment.

NEW—Holmes Baughman fine-coal dryer.

Industrial Physics & Electronics Co., Salt Lake City, Utah—NEW—Pneumatic belt scale.

Coal Show Exhibits

Interstate Equipment Div., Yara Engineering Corp., Elizabeth 4, N. J.—Recent aerial tramway installations.

Jeffrey Mfg. Co., Columbus 16, Ohio—Air-operated jig, Flex-rod MV conveyor, LMV conveyor, MMV conveyor, HMV conveyor, CS40 magnetic separator, "Slugger" crusher, car pullers, chains and sprockets, open-pan and grizzly feeders.

Kanawha Mfg. Co., Charleston, W. Va.—Preparation plants and equipment.

Kling Bros. Engineering Works, Chicago 51, Ill.—Self-cleaning motor-driven screen for removing suspended materials from water.

Kenan Oil Co., Cincinnati, Ohio—Coal-spray oils.

Laboratory Equipment Corp., St. Joseph, Mich.—Unit for 7-min sulphur analysis; unit for 10-min ashing in induction furnace.

Lecco Machinery & Engineering Co., Bluefield, W. Va.,—Lecco-Vib vibrating conveyors and screens, featuring 8x16-ft double-deck screen.

Link-Belt Co., Chicago 1, Ill.—Vibrating screens, Multi-Louvre dryer; other preparation equipment.

NEW—Wash box.

Lukens Steel Co., Coatesville, Pa.—Specialty steels for preparation services.

Ludlow-Saylor Wire Cloth Co., St. Louis 10, Mo.—Abrasion-resistant Super-Loy and Ludloy woven-wire screens, including unusual square and long openings in various wire diameters up to 1-in Super-Loy bars; finer-mesh cloth in various corrosion-resistant alloys and metals; fine-mesh cloth with hook-stripped edges for easy installation on tensioned screens; also coarser meshes with hooked edges for coarser sizing or supporting fine-mesh sizing screens, plus various styles of hook strips.

McLanahan & Stone Corp., Hollidaysburg, Pa.—Crushers, feeders and allied equipment.

NEW—Two-stage triple-roll crusher.

McNally-Pittsburg Mfg. Corp., Pittsburg, Kan.—"Coal preparation plants to make coal a better fuel."

Meckum Engineering, Inc., Chicago 4, Ill.—Meckum heavy-duty materials-handling pump for coal refuse and similar services; conveyors, elevators and other preparation equipment.

NEW—Meckum-SKB resonance vibrating screen.

Morris Machine Works, Baldwinsville, N. Y.—Type RX slurry pump.

Nolan Co., Bowerston, Ohio—Nolan radial screening plant for preliminary natural dewatering of coal and also applied to the desilting of sand from sand-flotation units to permit re-use of the sand.

Nordberg Mfg. Co., Milwaukee 1, Wis.—Symons V-screen for dewatering, desliming, dedusting and fine sizing of coal with new optional self-contained circulating oil-lubrication system; also Symons horizontal vibrating screen, Rod-Deck screen and vibrating bar grizzly.

Peterson Filters & Engineering Co., Salt Lake City, Utah—Filtration equipment.

Productive Equipment Corp., Chicago 12, Ill.—Vibrating screens.

Republic Steel Corp., Cleveland 1, Ohio—Stainless and other steels for preparation applications.

Roberts & Schaefer Co., Chicago 6, Ill.—Preparation plants and equipment.

Sanford-Day Iron Works, Inc., Knoxville 9, Tenn.—Model HKI hoist for handling railroad cars.

Stearns Magnetic Products, Div. Indiana Steel Products Co., Milwaukee 46, Wis.—Stearns wet permanent magnetic drum separator; Stearns suspended magnets.

W. S. Tyler Co., Cleveland 14, Ohio—5x12-ft Type F-600 Ty-Rock vibrating screen; 2x6-ft Ty-Rocket vibrating screen; Tyler standard screen scale testing sieves; woven-wire screens.

United States Steel Corp., Pittsburgh 30, Pa.—Cor-Ten and A-R steels for preparation services as epitomized in the Corbin central plant.

Universal Engineering Corp., Cedar Rapids, Iowa.—Wobbler feeder for feeding and scalping in one operation; center-feed reversible Impactor.

Wedge Wire Corp., Wellington, Ohio—Wedge Wire screens in different profiles and metals, featuring new Jumbo Wire and Migh-Tee bar screens for severe operating conditions.

Western Machinery Co., San Francisco 7, Calif.—Coal-preparation equipment, including heavy-media separation.

NEW—Wemco Fagergren flotation machine; Wemco Torque Flow solids pump.

Wilmot Engineering Co., Hazleton, Pa.—Preparation plants and equipment, featuring the Wilmot-OCC heavy-media vessel; also chains and sprockets for preparation plants and other applications.

Compressors Drills, Steel and Bits

Acme Machinery Co., Williamson, W. Va.—NEW—Model 275-A4J four-wheel-drive self-propelled air compressor for bolting or general use.

Bethlehem Steel Co., Bethlehem, Pa.—Hollow drill steel.

Chicago Pneumatic Tool Co., New York 17, N. Y.—C-P 32-A wet sinker drill.

Davey Compressor Co., Kent, Ohio—Rotary portable compressors and air tools.

Firth Sterling, Inc., Pittsburgh 30, Pa.—Percussion drill bits.

LeRoi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.—H22 drill; H111 drill with new shock-absorbing handle; H10AL drill; 75S2 stationary air compressor.

NEW—AL92B air-leg and automatic line oiler.

National Mine Service Co., Indiana, Pa.—Drill steel, bits and augers.

Schramm, Inc., West Chester, Pa.—Schramm self-propelled Rotadrills using compressed air for cleaning the holes.

Timken Roller Bearing Co., Canton, Ohio—Timken rock bits.

Face Preparation

Aeroquip Corp., Jackson, Mich.—Air-shooting hose.

Allegheny Ludlum Steel Corp., Detroit 20, Mich.—Carmet cemented carbide cutting and drilling bits, including heavy-duty J-style machine bits, and redesigned W-style drill bits.

American Brattice Cloth Corp., Warsaw, Ind.—Powder bags, including new models for underground use.

American Cyanamid Co., New York 20, N. Y.—Permissible explosives, electric blasting caps and blasting supplies.

Atlas Powder Co., Wilmington, Del.—Explosives, blasting supplies and accessories.

Austin Powder Co., Cleveland 13, Ohio—Drill bits and augers, tungsten-carbide cutting-machine bits.

Bowdil Co., Canton, Ohio—Chains for all types of cutting machines; machine bits and bars.

Hercules Powder Co., Wilmington, Del.—King-size permissible cartridges; other explosives products.

Cardox Corp., Chicago 1, Ill.—Portable and semiportable Airdox units.

Chicago Pneumatic Tool Co., New York 17, N. Y.—Hydraulic coal drills.

Cincinnati Mine Machinery Co., Cincinnati 25, Ohio—Cutter chains, cutter bars, bits and sprockets for all types of mining machines.

Firth Sterling, Inc., Pittsburgh 30, Pa.—Mining-machine and drill bits.

Jeffrey Mfg. Co., Columbus 16, Ohio—Jeffrey cutting and drilling equipment.

Joy Mfg. Co., Pittsburgh 22, Pa.—Cutters, drills and bits.

Kennametal, Inc., Bedford, Pa.—Complete line of carbide mining tools and accessories.

Long Co., Oak Hill, W. Va.—Model 2355 mobile hydraulic tractor drill.

McLaughlin Mfg. Co., Joliet, Ill.—Bits and tools for all types of drills.

Metallurgical Products Dept., General Electric Co., Detroit 32, Mich.—Carboloy cutter and drill bits.

National Mine Service Co., Indiana, Pa.—Bits and augers.

Explosives Div., Olin Mathieson Chemical Corp., E. Alton, Ill.—Explosives and blasting supplies; the Armstrong coal breaker.

Frank Prox Co., Inc., Terre Haute, Ind.—Regular and tool-steel-bit conventional cutting chains; tool-steel and tungsten-carbide bits.

Schroeder Bros. Corp., McKees Rocks, Pa.—Hydraulic coal drills.

Vascoloy-Ramet Corp., Waukegan, Ill.—V-R tungsten-carbide mining tools.

Roof Control

Acme Machinery Co., Williamson, W. Va.—NEW—Model 275-A4J air compres-

sor with stoper arms; Model HSJ Jumbolter.

American Mine Supply Co., Pittsburgh 19, Pa.—NEW—Visual tension indicator for roof bolts.

Allegheny Ludlum Steel Corp., Detroit 20, Mich.—Drill bits for roof-bolting, including redesigned TT and SS styles.

Armco Drainage & Metal Products Co., Middletown, Ohio—Armco tunnel liners.

Bethlehem Steel Co., Bethlehem, Pa.—Wedge-type and sleeve-type roof bolts.

Chicago Pneumatic Tool Co., New York 17, N.Y.—RBD-30 roof-bolt unit with standard long drilling spindle and equipment; RBD-30-SP self-propelled unit with special short spindle and standard equipment for low coal; hydraulic impact wrenches; 903 universal impact wrench kit; Model 610-RPSH and Model 3630-RPSH impact wrenches.

Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div. & Pacific Coast Div., New York 22, N. Y.—Roof bolts and accessories.

Firth Sterling, Inc., Pittsburgh 30, Pa.—Roof-drill bits.

J. H .Fletcher & Co., Huntington, W. Va.—Fletcher Model DA standard roof-control drill—single drill with slide, dust collector, and dual power and drive wheels.

NEW—Model DJ dual roof-control drill; Model DL narrow roof-control drill; Model DK miner roof-control drill.

Goodman Mfg. Co., Chicago 9, Ill.—Dustfree, waterfree roof-bolting drill.

Irwin Foundry & Mine Car Co., Irwin, Pa.—TCR mine props of metal construction and designed for easy installation and removal.

Joy Mfg. Co., Pittsburgh 22, Pa.—Single- and twin-boom hydraulic roof drills, stopers, etc.; Microdyne dust collector.

Kennametal, Inc., Bedford, Pa.—Kennametal bits for roof drilling.

LeRoi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.—S20 Vac-Nu-Matic stoper.

NEW—S12V stoper.

McLaughlin Mfg. Co., Joliet, Ill.—Roof augers and tools.

Metallurgical Products Dept., General Electric Co., Detroit 32, Mich.—Roof-drilling bits.

NEW—Low-cost Style PTV roof bit.

Mine Safety Appliances Co., Pittsburgh 8, Pa.—Collecting equipment for drill dust.

Ohio Brass Co., Mansfield, Ohio—O-B expansion shells and plugs.

NEW—Roof-support expansion unit.

Kurt Orban Co., Inc., Greenwich, Conn.—Type 53 Union steel pit prop, heavy and light section; Union "Four-Surface" prop with roof plate; Type 50 (Lamella) prop; Type L 52 Union tubular all-steel prop; floorplates and extensions for props; Union Vanwersch articulated steel bars (Types 52/73 and 52/96); Neuhaus setting edvice for Lamella props; setting wedges; 40-ton hydraulic prop.

NEW—Chock prop with extra-large floor and roof plates.

Osmose Wood Preserving Co. of America, Inc., Buffalo 9, N. Y.—Osmose timber-preservative methods, materials.

Pattin Mfg. Co., Marietta, Ohio—¾- and ⅝-in roof bolts; Styles D-1, D-2 and D-3 expansion shells; plate washers in various sizes.

Pittsburgh Screw & Bolt Co., Pittsburgh 30, Pa.—Roof bolts and accessories.

Republic Steel Corp., Cleveland 1, Ohio—Square-head bolt with rigid expansion shell for thin coal; forged wedge-head bolt with rigid expansion shell for thick coal.

Schroeder Bros., McKees Rocks, Pa.—Hydraulic impact wrenches.

Sika Chemical Corp., Passaic, N. J.—NEW—Perfo roof-bolting system based on cementing bolts in place.

Templeton, Kenly & Co., Broadview, Ill.—NEW—No. 642 6-ton geared screw-type and 139A 5-ton plain screw-type timber jacks.

Timken Roller Bearing Co., Canton, Ohio—Roof-drilling bits.

Vascoloy-Ramet Corp., Waukegan, Ill.—Roof-drill and auger bits.

NEW—Percussion-type "Suction Bit" for roof drilling.

W. Va. Works, Connors Steel Div., H. K. Porter Co., Inc., Huntington, W. Va.—Full line of roof bolts, including ready-to-install "Cone-Neck" type.

Hoisting

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.—Quick-dumping bottom-discharge skip.

Robert Holmes & Bros., Inc., Danville, Ill.—Hoists, sheaves, skips, cages; automatic skip- and cage-loading and dumping equipment.

Mine Cars, Shuttle Cars Mine Locomotives, Utility Cars

ACF Industries, Inc., New York 8, N. Y.—Big 8-wheel rotary-dump car; mine-car trucks.

Acme Machinery Co., Williamson, W. Va.—Utility car made by omitting drills from new Model HSJ-4WD Jumbolter.

Bethlehem Steel Co., Bethlehem, Pa.—Mine cars and mine wheels.

Cleveland Vibrator Co., Cleveland, Ohio—Vibrators for car dumpers.

Differential Steel Car Co., Findlay, Ohio—Large-capacity cars for thin-seam mining.

Enterprise Wheel & Car Corp., Bristol Tenn.-Va.—8-wheel mine car with National Malleable & Steel Castings running gear, Timken bearings and Willison couplers.

General Electric Co., Schenectady 5, N. Y.—NEW—15-ton low-height Island Creek haulage locomotive.

Goodman Mfg. Co., Chicago 9, Ill.—Low-vein shuttle car.

Irwin Foundry & Mine Car Co., Irwin, Pa.—8-wheel "Streamliner" mine car; patented 4-wheel trucks.

Joy Mfg. Co., Pittsburgh 22, Pa.—15-ton high-seam shuttle cars; low-seam shuttle cars.

National Malleable & Steel Castings Co., Cleveland 6, Ohio—Automatic couplers, including the Willison for mine cars and the Type F for large strip and open-pit cars; also mine-car rubber-cushioning devices and mine-car trucks with friction dampening to control car bounce.

National Mine Service Co., Indiana, Pa.—NEW—NMS AC and DC Torkar shuttle cars.

Ohio Brass Co., Mansfield, Ohio—O-B automatic couplers.

Sanford-Day Iron Works, Inc., Knoxville 9, Tenn.—330-cu ft 4-wheel automatic dropbottom car with overlapping ends for continuous trip loading without spillage, featuring outside spring-mounted trucks, twin jerk-out safety latches, and complete sealing of doors against leakage; other S-D dropbottom cars and mining equipment.

Schroder Bros. Corp., McKees Rocks, Pa.—Self-propelled track-type utility truck.

Rockwell Spring & Axle Co., Timken-Detroit Axle Div., Detroit 32, Mich.—TA-176A "Mine-Car Drive"—designed for shuttle cars, "rugged enough to operate on the roughest mine floor, compact enough to operate in seams as thin as 30 in."

United States Steel Corp., Pittsburgh 30, Pa—Cor-Ten mine and railroad cars.

Watt Car & Wheel Co., Barnesville, Ohio—Mine cars and equipment.

Man Cars and Buses, Personnel Facilities

Irwin Foundry & Mine Car Co., Irwin, Pa.—8-wheel Irwin "Man-Van" car.

Lee-Norse Co., Charleroi, Pa.—NEW—"Low-Type" model TJ5 Lee-Norse Mine Portal Bus.

Moore Co., Charleston, W. Va.—The Moore Lockerbasket for modern change houses.

Mine-Car Feeders, Hoists, Dumps

Kanawha Mfg. Co., Charleton 26, W. Va.—Mine-car dumping, feeders, and dumping installations.

Nolan Co., Bowerston, Ohio—Nolan hydraulic Porta-Feeder, automatic mine-car loading station and hydraulic lift dolly. The dolly is a recently developed unit designed to provide a convenient and efficient method of transporting the Porta-Feeder in the mine. Nolan also will feature its gear-driven rotary car dumper and the Nolan trip feeder-retarder, the latter combining both feeding and retarding in a single chain-type unit.

Sanford-Day Iron Works, Inc., Knoxville 9, Tenn.—HKD hoist for underground car-loading stations.

Schroeder Bros., McKees Rocks, Pa.—Hydraulic car spotter and automatic loading station.

Coal Show Exhibits

W. R. Stamler Corp., Paris, Ky.—Stamler Model 5SH hydraulic car spotter with Stamler automatic loading-station controls for belthead application. The combination will load cars automatically and to more uniform weights than is possible with manual methods.

Track, Track Cleaners

American Mine Door Co., Canton, Ohio—Model 30 heavy-duty track cleaner with 50% more power and other improvements.

NEW — Aero-Throw air-powered switchthrower.

Bethlehem Steel Co., Bethlehem, Pa.—Heavy-duty trackwork, including switch material, guard rail, frogs, switch stands, steel mine ties, rails, etc.

Chicago Pneumatic Tool Co., New York 17, N.Y.—C-P 115 pneumatic spike driver.

LeRoi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.—OT 11 tamper.

Osmose Wood Preserving Co. of America, Inc., Buffalo 9, N. Y.—Tie preservation by pressure treatment.

United States Steel Corp., Pittsburgh 30, Pa.—Trackwork, including switches, switch stands and Taylor rail braces.

West Virginia Works, Connors Steel Div., H. K. Power Co., Inc., Huntington, W. Va.—Track materials.

Mine Conveyors, Belt, Accessories

Barber-Greene Co., Aurora, Ill.—B-G belt conveyor, carriers, return rollers and accessories, including 60-in-wide troughing carriers and return rolls.

Boston Woven Hose & Rubber Co., Boston 3, Mass.—"Flameout" and other conveyor belting.

Ensign Electric Co., Huntington, W. Va.—Ensign centrifugal switches.

Flexible Steel Lacing Co., Chicago 44, Ill.—NEW—No. 375 Flexco hinged belt fastener; other belt-fasteners and tools; Rema repair service.

General Splice Corp., New York 4, N. Y.—Minet belt splice.

Goodman Mfg. Co., Chicago 9—NEW—Goodman Ropex extensible belt conveyor.

B. F. Goodrich Industrial Products Co., Akron, Ohio—Turnover conveyor-belt system.

Goodyear Tire & Rubber Co., Akron 16, Ohio—Goodyear conveyor belting.

Hamilton Rubber Mfg. Corp., Trenton 3, N. J.—Hamilton rubber products for the mining industry.

NEW—Pyroprene conveyor belting.

Hewitt-Robins Incorporated, Stamford, Conn.—Conveyors, idlers, belting.

Industrial Physics & Electronics Co., Salt Lake City 2, Utah—NEW—Detramp tramp-iron detector.

Irwin-Foundry & Mine Car Co., Irwin, Pa. Huwood-Irwin G-40 belt conveyor.

Jeffrey Mfg. Co., Columbus 16, Ohio—87A extensible belt conveyor, 76B Molveyor, 94A bridge conveyor, 61AM conveyor, Reliance belt idler with SA return, impact idler with spool return, and chain, sprockets, takeups and other conveyor accessories.

Joy Mfg. Co., Pittsburgh 23, Pa.—NEW—Joy extensible belts with 90-deg turns; Limberope conveyor; and Ready-Span prefabricated conveyor frames.

Link-Belt Co., Chicago 1, Ill.—Link-Belt conveyor components and accessories.

Long Co., Oak Hill, W. Va.—Long equipment for mobile-conveyor continuous-haulage mining; "Superflite" conveyor chain; "Whispering Joint" chain-conveyor pans.

E. F. Marsh Engineering Co., St. Louis 10, Mo.—NEW—Marco tubular-frame conveyors.

National Mine Service Co., Indiana, Pa.—Scandura fire-resistant P.V.C. conveyor belting.

NEW—Hayden belt splicer for hand operation and production unit for mechanical splicing.

Quaker Rubber Div., H. K. Porter Co., Inc., Philadelphia, Pa.—Conveyor belting.

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Ray-Man, Homocord and Homoflex conveyor belting with new super-strength fiber tension members.

United States Rubber Co., New York 20, N. Y.—Conveyor belting.

Wilcox Mfg. Co., Raleigh, W. Va.—NEW—Extensible chain conveyor.

Pumping and Drainage

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Hel-Cor pipe, spiral-welded pipe, corrugated-metal pipe and asbestos-bonded pipe.

Barrett, Haentjens & Co., Hazleton, Pa.—Hazleton pumping equipment and accessories.

B. F. Goodrich Industrial Products Co., Inc., Akron 18, Ohio—Mining hose.

Chicago Pneumatic Tool Co., New York 17, N. Y.—CP-20 and CP-7 pneumatic sump pumps.

Flood City Brass & Electric Co., Johnstown, Pa.—2½x3-in Flood City plunger-type gathering pump; Flood City automatic pump-priming system.

Femco, Inc., Irwin, Pa.—Remote pumping controls and indicators.

Gorman-Rupp Co., Mansfield, Ohio—Self-priming centrifugal pumps, including acid-resisting types; engine-driven "30 Series" stripping pumps.

NEW — "80 Series" pneumatically mounted pumps for stripping.

Ohio Brass Co., Mansfield, Ohio—Valves.

Oster Mfg. Co., Cleveland 32, Ohio—Portable pipe and bolt-threading machines; Oster sewer-cleaning machine.

Quaker Rubber Div., H. K. Porter Co., Inc., Philadelphia, Pa.—Hose.

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Hose for mine service.

Reynolds Metals Co., Louisville 1, Ky.—Aluminum pipe.

Republic Steel Corp., Cleveland 27, Ohio—Republic plastic pipe.

Sika Chemical Corp., Passaic, N. J.—Quick-setting compounds for stopping water flow.

United States Steel Corp., National Tube Div., Pittsburgh 30, Pa.—Plastic, steel and alloy pipe.

United States Rubber Co., New York 20, N. Y.—Hose for mine service.

Victualic Co. of America, Elizabeth, N. J.—Victualic piping method comprising standard Style 77 couplings, new speedy snap-joint Style 78 couplings, Vic-Groover portable tools; "Full-Flow" fittings for grooved pipe; Roust-A-Bout couplings through 12 in for plain-end pipe.

NEW—Vic-Easy piping method for light-wall pipe or tubing.

Reynolds Metals Co., Louisville 1, Ky.—Aluminum mine-service pipe.

Ventilation

American Brattice Cloth Corp., Warsaw, Ind.—Brattice cloth and ventilation tubing, including improved spiral wire reinforced tubing making it possible to convert regular blower tubing into exhaust tubing.

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Corrugated overcast sections.

Bemis Bro. Bag Co., St. Louis 2, Mo.—Flexipipe ventilation tubing and accessories.

Femco, Inc., Irwin, Pa.—Remote fan indicator and control equipment.

Fulton Bag & Cotton Mills, New Orleans 13, La.—F.F.F.F. and Blaze Braker brattice cloth.

Jeffrey Mfg. Co., Columbus 16, Ohio—Aerodyne fans and Midget blowers.

Joy Mfg. Co., Pittsburgh 23, Pa.—Ventilating equipment.

Tractors, Tractor Loaders, Bulldozers, Graders

Allis-Chalmers Mfg. Co., Tractor Group, Milwaukee 1, Wis.—4-cu yd tractor shovel, motor grader and motor scraper.

Caterpillar Tractor Co., Peoria, Ill.—DW20 wheel tractor equipped with Athey 45-ton PH20 coal hauler.

NEW—D9 crawler tractor, No. 9S tilting bulldozer, 9U bulldozer, and side-dumping bucket attachment for No. 955 Traxcavator.

Clark Equipment Co., Construction Machinery Div., Benton Harbor, Mich.—Michigan Model 175A and 75A tractor shovels, 2¾ and 1¼ cu yd.

NEW—Model 375A 6-cu yd tractor shovel; tractor dozer with full-power

blade measuring nearly 12 ft wide.

Galion Iron Works & Mfg. Co., Galion, Ohio – NEW – T-700 Grade-O-Matic grader.

Euclid Div., General Motors Corp., Cleveland 17, Ohio—NEW—Single-engine 218-hp Model C-6 crawler tractor; Twin-Power Model TC-12 436-hp crawler tractor.

Frank G. Hough Co., Libertyville, Ill. —Model HOD "Payloader" with Campbell sliding cab, backrip scarifier and H & L teeth on 90-in bucket; Model HU "Payloader" with 1-cu yd bucket. Both feature 4-wheel drive, power-transfer differential, rear-wheel steering and 4-wheel power brakes.

NEW—Drott 2.4 and 4-in-1 buckets.

International Harvester Co., Chicago 1, Ill.—International TD-18 crawler tractor with Drott 3-cu yd 4-in-1 bucket; TD-24 tractor with U-blade for handling 19 tons of coal.

LeTourneau-Westinghouse Co., Peoria, Ill.—Tournatractor.

Trucks, Engines, Torque Converters, Generators

Allis-Chalmers Mfg. Co., Tractor Group, Milwaukee 1, Wis.—Diesel engines.

Caterpillar Tractor Co., Peoria, Ill.—D397 and other diesel engines.

Continental Motors Corp., Muskegon, Mich.—Red Seal "Cushion Power" diesels.

Cummins Engine Co., Columbus, Ind. —600-hp VT-12 and 335-hp NRT-6 Turbodiesel engines; NHRBIS-600-TC torque-converter unit.

NEW—735-hp V-8 diesel.

Dart Truck Co., Kansas City 8, Mo.—NEW—Model 50S-BDT bottom-dump coal hauler.

Detroit Diesel Engine Div., General Motors Corp., Detroit 28, Mich.—236-hp Turbopower Series 71 engine, 125-kw diesel-electric set, torque converters, Hydrostarter.

NEW—375-hp 6-110 Roots blower diesel.

Euclid Div., General Motors Corp., Cleveland 17, Ohio—NEW—Model 24-TDT-128W 360-hp 51-ton coal hauler.

Hercules Motors Corp., Canton, Ohio —NEW—Line of interchangeable gasoline and diesel engines; modern-design Hercules power units.

International Harvester Co., Chicago 1, Ill.—Model 95 24-ton Payhauler with coal body for off-highway service.

LeTourneau-Westinghouse Co., Peoria, Ill.—NEW—LW-30 30-ton off-highway hauler. 35-ton Model B rear-dump hauler.

Fuller Mfg. Co., Kalamazoo, Mich.—Transmissions for use with engines up to 600 hp. Semi-automatic designs included.

NEW—The R-1550 RoadRanger transmission designed specifically for extremely heavy-duty off-highway service.

Mack Trucks, Inc., Somerville, N. J.—LRSW truck with 40-cu yd coal body; Mack B-63SX and B-81SX 6-wheel diesel trucks; LVX 4-wheel hauler; Mack ENDT turbocharged diesel engine; TRDX-510 10-speed duplex transmission; and Mack Power Divider.

National Supply Co., Pittsburgh, Pa.—NEW—Heavy-duty National torque converter.

Timken Detroit Axle Div., Rockwell Spring & Axle Co., Detroit 32, Mich.—PR-200 planetary axle, PR-700 planetary axle, SFDD-4600 tandem axle, FU-900 front axle, heavy-duty "P"-Series power brakes.

Twin Disc Clutch Co., Rockford, Ill.—Torque converters, including three-stage and new single-stage units; power take-offs; air-actuated clutches.

White Diesel Engine Div., The White Motor Co., Springfield, Ohio—NEW—White Model 40 "Superior" engine.

Motors and Controls, Conversion Units, Batteries

Allis-Chalmers Mfg. Co., Industries Group, Milwaukee 1, Wis.—Electric motors.

Exide Industrial Div., Electric Storage Battery Co., Philadelphia 2, Pa.—Exide-Ironclad batteries for locomotives, shuttle cars and other equipment; Exide-Manchex batteries for stationary operations; Silvium grid alloy for positive plates.

NEW—Motive-power battery.

Ensign Electric & Mfg. Co., Huntington, W. Va.—AC and DC mine-type magnetic starters; AC and DC mine power distribution boxes; Bureau of Mines pushbuttons.

Femco, Inc., Irwin, Pa.—Remote monitoring and control of substations.

Flood City Brass & Electric Co., Johnstown, Pa.—Flood City fused switch boxes, locomotive transfer switches.

Gould National Batteries, Inc., Trenton 7, N. J.—Motive-power batteries for mine applications.

General Electric Co., Schenectady 5, N. Y.—Products for efficient power distribution, including 300-kw portable rectifier car, portable AC substation, Thymo-trol adjustable speed conveyor drive, TriClad motors, control devices, DC motors.

NEW—Skid-mounted stripping substation; illuminated push button.

Industrial Physics & Electronics Co., Salt Lake City 2, Utah—Control systems.

I-T-E Circuit Breaker Co., Philadelphia 30, Pa.—Circuit breakers, including automatic reclosing types.

Ohio Brass Co., Mansfield, Ohio— Control equipment, including substation lightning arresters.

NEW—3,000-amp safety switch.

Post-Glover Electric Co., Cincinnati 2, Ohio—Mine resistors; automatic transfer switches for locomotives, mercury switches, grid-type starters, reel-motor contactors.

Reliance Electric & Engineering Co., Cleveland 10, Ohio—Adjustable-speed motors, AC motors, right-angle worm-gear AC gearmotor, AC pump motors and Reeves Vari-Speed Moto-Drive.

Westinghouse Electric Corp., Pittsburgh 30, Pa.—Mine-type motors and controllers, Ignitron rectifiers, portable substations, power centers, control centers, switchhouses and battery chargers.

Electrical Wire, Cable, Bonds, Splices, Ground Detectors

Anaconda Wire & Cable Co., New York 4, N. Y.—Shuttle-car, Type W, Type G, shovel SH-D, mine power and other cables.

NEW—Securityflex shuttle-car cable.

Burndy Corp., Norwalk, Conn.—NEW —Hylink repair splices.

Central Mine Supply Co., Mt. Vernon, Ill.—NEW—"Protecto" ground-fault protection equipment.

Collyer Insulated Wire Co., Pawtucket, R. I.—Mining cables.

Elreco Corp., Cincinnati 25, Ohio—Overhead line materials, including section insulators, splicers, sliders, trolley frogs, clamps, hangers and fittings.

Ensign Electric & Mfg. Co., Huntington, W. Va.—Ensign Bulletin 3000 Ground-I-Cators; Ensign rail bonds.

Flood City Brass & Electric Co.—Trolley-line material.

General Cable Corp., New York 17, N. Y.—Heavy-duty mining cables.

General Electric Co., Schenectady 5, N. Y.—GE wire and cable for mining.

Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, Calif.—Mining-machine trailing cable.

National Mine Service Co., Indiana, Pa.—Cable-splicing service.

Ohio Brass Co., Mansfield, Ohio—Trolley-line and rail-bond materials, locomotive current-collection equipment.

NEW—Locomotive current collector; hanger insulation tester.

Okonite Co., Passaic, N. J.—Electrical cables, featuring "Red Saddle" twin shuttle-car and other Okocord trailing cables.

Penn Machine Co., Johnstown, Pa.—Everlast Super-Weld rail bonds.

John A. Roebling's Sons Corp., Trenton, N. J.—Electrical wire and cable for mining applications.

Rome Cable Corp., Rome, N. Y.—Rome 60 neoprene-sheathed trailing and power-distribution cables; polyethylene-insulated and sheathed high-voltage mine-power distribution cables.

Simplex Wire & Cable Co., Cambridge 39, Mass.—Simplex-Anhydrex insulated cables; Simplex-Tirex portable cords and cables; Simplex-Condex interlocked armored cable.

Standard Devices Co., Cleveland 22, Ohio—NEW—Fireproof trolley taps and cable protectors.

United States Steel Corp., American Steel & Wire Div., Cleveland, Ohio—"Amerclad" cord and cable.

Coal Show Exhibits

Plant Lighting, Lamps

General Electric Co., Schenectady 5, N. Y.—NEW—General-purpose floodlight.

Radiant Lamp Corp., Newark 8, N. J.—Mercury-vapor and incandescent lamps, featuring the T10 tubular hard-glass spatterproof rough-service lamps; Type PS weatherproof hard-glass lamps to 2,000 w; R40, R60 and R80 Hi Flood hard-glass reflector-type incandescent lamps, standard and high voltage to 275, 150 to 1,500 w; 250-, 375- and 500-w R40 hard-glass reflector Hi-Heat lamps; R40 reflector-type "Long-Neck" lamps in standard and high-voltage types.

NEW—R-60 400-w mercury-vapor lamps.

Power Transmission

Dodge Mfg. Corp., Mishawaka, Ind.—Flexidyne dry fluid drives and couplings, with new developments; Taper-Lock steel conveyor pulleys; Torque-Arm speed reducers; Taper-Lock V-belt drives; interchangeability of bushings in sheaves, sprockets, couplings and conveyor pulleys.

NEW—Para-flex shaft coupling; higher-horsepower Torque-Arm speed reducer.

Hewitt-Robins, Inc., Stamford, Conn.—Speed reducers.

Link-Belt Co., Chicago 1, Ill.—Precision chains; other power-transmission equipment.

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passic, N. J.—NEW—polv-V drive.

United States Rubber Co., New York 20, N. Y.—Power-transmission belts, including Power-Grip timing belts and belts reinforced with fabric and steel wire.

Westinghouse Electric Corp., Pittsburgh 30, Pa.—Gearing.

Whitney Chain Co., Hartford 2, Conn.—American Standard steel power-transmission chains.

Bearings

Bearing Service Co., Pittsburgh 13, Pa.—Ball and roller bearings and anti-friction devices.

Dodge Mfg. Corp., Mishawaka, Ind.—Dodge-Timken all-steel bearings. NEW—Micro-Mount method of mounting pillow-block bearings on shafts. Federal-Mogul Service, Detroit 13, Mich.—Ball and roller bearings.

Ieffrey Mfg. Co., Columbus 16, Ohio—J, K, HD, MG and L pillow blocks.

Link-Belt Co., Chicago 1, Ill.—Anti-friction bearings, pillow blocks.

New Departure Div. General Motors Corp., Bristol, Conn.—Single- and double-row ball bearings, all types, with or without shields or seals; steel balls for bearings; bearing-research and testing facilities.

NEW—Line of pillow blocks interchangeable with all sizes now manufactured; bore, ½ to 2 15/16 in.

SKF Industries, Inc., Philadelphia 32, Pa.—SKF antifriction bearings and pillow blocks, including Tyson tapered roller bearings, and improved spherical roller bearing, and a positive center lubrication method for spherical roller bearings.

Timken Roller Bearing Co., Canton 6, Ohio—Timken roller bearings.

Hydraulics

Aeroquip Corp., Jackson, Mich.—Aeroquip flexible hose, detachable re-useable fittings and self-sealing couplings.

NEW—Very high pressure hose.

Joy Mfg. Co., Pittsburgh 23, Pa.—"Surgepruf" no-skive hydraulic couplings and tools.

Parker Appliance Co., Cleveland 12, Ohio—Triple-lok flared tube fittings; Feru-lok flareless tube fittings; Hoze-lok fittings and tube-working tools.

NEW—Non-skive Hoze-lok fittings for rubber-covered wire-braid hose.

Schroeder Bros. Corp., McKees Rocks, Pa.—Bench and portable hydraulic testing equipment; line filters for machine installation and portable filter buggies.

NEW—Integrally relieved line filter with "Tattletale" indicator.

Shell Oil Co., New York, N. Y.—Hydraulic fluids.

Standard Devices Co., Cleveland 22, Ohio—NEW—JIC hydraulic hose fittings.

Weatherhead Co., Ft. Wayne, Ind.—Weatherhead flared and flareless brass and steel tube fittings, re-useable hose ends, bulk hose and hose assemblies.

NEW—Hydraulically operated swaging machine.

Wire Rope, Steel, Steel Products

American Cable and Hazard Wire Rope Div., American Chain & Cable Co., Detroit 2, Mich.—Wire ropes for mining.

Armco Drainage & Metal Products Co., Middletown, Ohio—Armco "Steelox" prefabricated buildings for mines.

Bethlehem Steel Co., Bethlehem, Pa.—Wire rope and slings.

Broderick & Bascom Rope Co., St. Louis 15, Mo.—"Yellow Strand" wire rope.

Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div., New York 22, N. Y.—Wire rope for mine service.

Irwin Foundry & Mine Car Co., Irwin, Pa.—Chains and castings.

Jones & Laughlin Steel Corp., Pittsburgh 30, Pa.—Wire rope and slings; JalKlamp mechanical splice.

Leschen Wire Rope Div., The Watson Stillman Co., subsidiary H. K. Porter Co., Inc., St. Louis 12, Mo.—Hercules "Red-Strand" wire rope and slings.

Lukens Steel Co., Coatesville, Pa.—"T-1" and stainless-clad steels.

Macwhyte Co., Kenosha, Wis.,—Wire rope, round and flat-braided slings, and swaged-fitting assemblies.

Pittsburgh Screw & Bolt Corp., Pittsburgh 30, Pa.—Complete line of fasteners, both standard and special, for mining and related industries.

Republic Steel Corp., Cleveland 27, Ohio—Republic welded chain and chain slings; Republic fasteners, including new Nylok bolts and nuts for positive locking under all conditions; and Republic Enduro stainless, high-strength and alloy steels.

John A. Roebling's Sons Corp., Trenton 2, N. J.—Wire rope for mining.

Union Wire Rope Corp., Kansas City 26, Mo.—"Tuffy" dragline, scraper and dozer ropes and "Tuffy" slings.

United States Steel Corp., Pittsburgh 30, Pa.—T-1 steel as used in 60- and 70-cu yd shovel dippers; Cor-Ten, A-R, Man-Ten and Tri-Ten "E" steels for various mining applications.

United States Steel Corp., American Steel & Wire Div., Cleveland, Ohio—"Tiger Brand" wire rope.

Wire Rope Corp. of America, St. Joseph, Mo.—Mining cable and slings.

Youngstown Sheet & Tube Co., Youngstown, Ohio—Steel products.

Lubrication

Ashland Oil & Refining Co., Ashland, Ky.—Ashland, Valvoline and Enarco mine and industrial lubricants.

Cities Service Petroleum, Inc., New York 5, N. Y.—Pacemaker T and other oils.

D-A Lubricant Co., Inc., Indianapolis, Ind.—Heavy-duty oils and lubricants for mining.

Gulf Oil Corp., Pittsburgh 30, Pa.—"Gulf Contractors' Guide," Gulf Petro-Engineering Service.

NEW—Gulfcrown lithium-base multi-purpose grease.

Lincoln Engineering Co., St. Louis 20, Mo.—Lubrication equipment of all types.

NEW—Power-driven centralized pump servicing an automatic injector circuit for equipment lubrication.

Pure Oil Co., Columbus 15, Ohio—Poco Hypronox grease, Poco Gearshield grease, Puro grease, Poco PB lubricants, Puropale RX oils and Sultana X heavy-duty oil.

NEW—Poco HT-EP grease.

Shell Oil Co., New York 20, N. Y.—Motor oils, industrial greases.

Sinclair Refining Co., New York 20, N. Y.—Sinclair lubricants.

Socony Mobil Oil Co., New York 4, N. Y.—Industrial lubricants.

Standard Oil Co. (Ind.), Chicago 80, Ill.—Standard Oil facilities for serving the coal industry.

Standard Oil Co. (Ohio), Cleveland, Ohio—Industrial lubricants and services.

Texas Co., New York 17, N. Y.—Texaco lubrication products for coal mining.

Trabon Engineering Corp., Cleveland 3, Ohio—Automatic lubricating systems.

Whitmore Mfg. Co., Cleveland 15, Ohio—Open-gear, dipper-stick and cable lubricants; lubricants for gear cases and antifriction and sleeve bearings.

New Renewal Parts

Aeroquip Corp., Jackson, Mich.—Truck air-brake hose.

Allied Steel & Tractor Products, Inc., Cleveland 5, Ohio—Grip-Lug tractor grouser bars, Tuf-A-Brase alloy wear-resistant plate, dipper teeth.

Clarkson Mfg. Co., Nashville, Ill.—Redbird Uni-Flight conveyor chains.

Cooke-Wilson Electric Supply Co., Pittsburgh 3, Pa.—Gears, pinions, worms, bevel gears, sprockets and other replacement parts.

Electric Steel Foundry Co., Portland 10, Ore.—Esco tested stripping teeth; new design ArcEdge cutting edges; dragline rigging and replacement parts.

Flood City Brass & Electric Co., Johnstown, Pa.—Centrifugal-pump parts; replacement parts for mine locomotives, loading machines and continuous miners.

Goodman Mfg. Co., Chicago 9, Ill.—Goodman replacement parts.

Jeffrey Mfg. Co., Columbus 16, Ohio—Jeffrey replacement parts.

Joy Mfg. Co., Pittsburgh 23, Pa.—"Genuine" Joy replacement parts.

Kelly Mfg. Co., Charleston 21, W. Va.—Gears, worms, shafts and other replacement parts for cutters, loaders, shuttle cars, trucks, etc.

Kensington Steel Co., Chicago 28, Ill.—Manganese-steel repair parts for coal-mining equipment.

Mining Machine Parts, Inc., Cleveland 14, Ohio—Mechanical and electrical replacement parts.

National Electric Coil Co., Columbus, Ohio—Replacement coils for motors and generators.

National Mine Service Co., Indiana, Pa.—Replacement coils for electrical controls and motors.

Ohio Carbon Co., Cleveland 11, Ohio—Brushes for motors, generators, etc.

Page Engineering Co., Chicago 38, Ill.—Reversible tooth points with replaceable tips, double wedge load sockets, Twin-Pin connecting links, etc.

Penn Machine Co., Johnstown, Pa.—Replacement parts for the latest types of mining equipment.

Tool Steel Gear & Pinion Co., Cincinnati 16, Ohio—Hardened gears, pinions, sprockets, sheave wheels, shafts, etc., for mining.

Westinghouse Electric Corp., Pittsburgh 30, Pa.—Renewal parts.

West Virginia Armature Co., Bluefield, W. Va.—Armature and field coils.

Maintenance

Blackhawk Mfg. Co., Milwaukee 1, Wis.—Porto-Power equipment.

NEW—Line of hydraulic hollow rams and attachments for pulling gears, pinions, pulleys and other tightly fitted parts.

Harnischfeger Corp., Milwaukee 46, Wis.—Welding machines.

Kennametal, Inc.—Kenface, carbide hardfacing material, Kennametal wear applications.

Martindale Electric Co., Cleveland 7, Ohio—Maintenance equipment and tools for electric motors and generators, such as, mica undercutters, commutator grinders and stones, etc.; electrical testing instruments, including ammeters, voltage testers, ohmmeters, growlers, field-coil testers, etc.; general maintenance items, including portable electric blowers, industrial vacuum cleaners, wheel and gear pullers, electric etchers, demagnetizer, etc.

National Electric Coil Co., Columbus 16, Ohio—Rebuilding and modernizing mobile underground mining units.

National Mine Service Co., Indiana, Pa.—Panel rebuilding.

Post Glover Electric Co., Cincinnati 2, Ohio—Resistance arc welders.

Proto Tool Co., Div. Pendleton Tool Industries, Inc., Los Angeles 54, Calif.—Hand tools comprising approximately 1,200 items; pullers and power-drive sockets.

Rust-Oleum Corp., Evanston, Ill.—Rust-preventive coatings.

Sanford-Day Iron Works, Inc., Knoxville 9, Tenn.—Rehabilitation of cast or rolled-steel wheels.

Templeton, Kenly & Co., Broadview, Ill.—Jenny high-pressure 30- to 100-ton hydraulic pullers; standard 3- to 100-ton industrial jacks; 84A, 85A and 86A 5-ton mining-machine jacks; 1017 10-ton low-height and other models of mechanical ratchet lowering jacks, including No. 32 5-ton and Nos. 9225 and A9225 units; Simplex No. 310A 15-ton swivel-base emergency unit, 5- to 10-tons standard units, and geared ratchet units; cable-tensioning jacks, pole-pulling jacks, standard speed jacks, shoring jacks and push-and-pull jacks.

NEW—Remotrol hydraulic rams, A-1022 10-ton aluminum ratchet lowering jacks, Rol-Toe foot-lift hydraulic jacks.

United States Rubber Co., New York 20, N. Y.—Packing, electrical tape.

West Virginia Armature Co., Bluefield, W. Va.—Undercutter for conditioning armatures.

Whitney Chain Co., Hartford 2, Conn.—Chain for all types of loaders and continuous miners.

Safety Products, Mine Lighting, Communication

American Mine Door Co., Canton 6, Ohio—Little Chief rockduster adaptable to either wet or dry dusting.

Central Mine Supply Co., Mt. Vernon, Ill.—**NEW**—Liquid rockdusting machine for use behind mining machines or continuous miners on-shift to keep dusting up to the face.

Elliott Service Co., Mt. Vernon, N. Y.—Elliott bulletin board display service.

Exide Industrial Div., Electric Storage Battery Co., Philadelphia 2, Pa.—Exide-Lightguard for emergency lighting.

Femco, Inc., Irwin, Pa.—Communication equipment for underground and surface use.

NEW—Permissible mine lighting system.

General Electric Co., Schenectady 5, N. Y.—**NEW**—Intra-Tel closed-circuit television system.

Hendrick Mfg. Co., Carbondale, Pa.—Mitco open floor grating and stair treads.

Martindale Electric Co., Cleveland 7, Ohio—Martindale protective dust masks and eyeshields.

Mine Safety Appliances Co., Pittsburgh 8, Pa.—Edison Model R-4 electric cap lamp, M-S-A Minephones and Hoistphones; rockdusters; Scotchlite-brand reflective safety signs, tape and paint; complete line of personal protection equipment, including breathing apparatus, self-rescuers, first-aid supplies, hats, safety clothing and belts.

Mountain State Equipment Co., Taylorville, Ill.—Monson wet rockduster.

National Mine Service Co., Indiana, Pa.—Wheat electric cap lamps and Wheat automatic charging with metal rack and electronically controlled voltage regulation, Femco communication equipment, Riken gas indicators, first-aid cabinets and materials, safety equipment and Koehler flame safety lamps.

Raybestos-Manhattan Co., Manhattan Rubber Div., Passaic, N. J.—Safety trolley-wire guard.

Mining Specialties, Services

Coal Age, New York 36, N. Y.—Publishing services for the coal industry, including those of its affiliates, Keystone Coal Buyers Manual and Keystone Coal-Mine Directory.

Elliott Service Co., Mt. Vernon, N. Y.—Management Information Bulletin, suggestion systems, Elliott Bulletin Board Display Service.

Mechanization, Inc., Washington 4, D. C.—Coal-mining and utilization publications.

Mining Congress Journal—Publishing services for the coal mining, metallic and non-metallic mining industries.

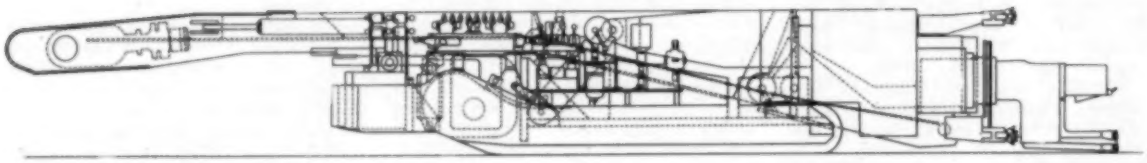
Mining and Quarrying, New York, N. Y.—New products publishing service.

Tires

Mitchell Industrial Tire Co., Inc., Chattanooga, Tenn.—Heavy-duty mine tires.

Modern Equipment for Today's Mining

Low seam units, more capacity, and simplified design highlight AMC Cleveland Coal Show exhibits May 13-16.

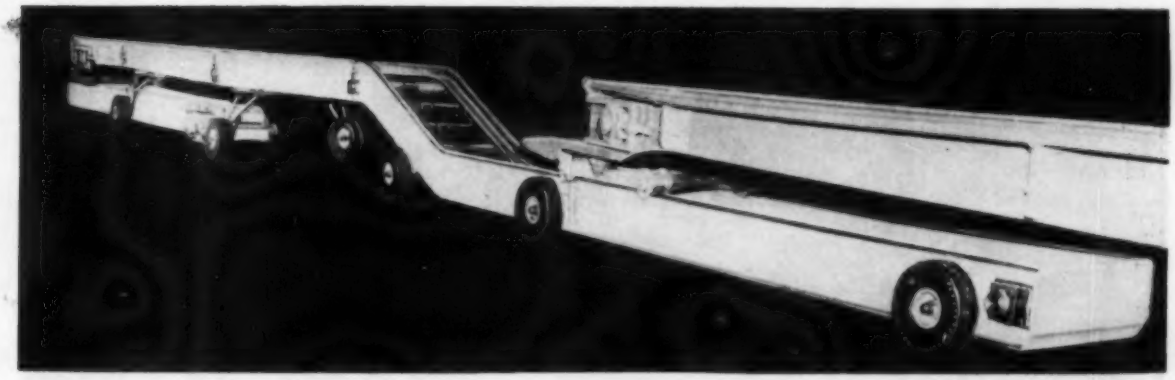


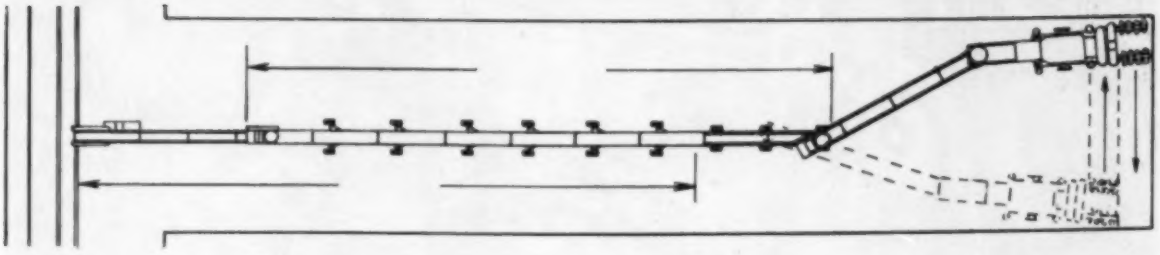
Variable Height Continuous Borer Features Four Rotor Arms

The Goodman Mfg. Co.'s Type 300 continuous borer is a variable height machine with the ability to change cutting height from a minimum of 4 ft to a maximum of 5½ ft as it operates. The borer is a single pass machine, cutting a 13-ft, 10-in path at minimum height, a 14-ft, 10-in path at 60-in or 66-in heights. A retracted height of 40 in permits tramming under roof bolts, and a retracted width of 12 ft provides side clearances. The borer is equipped with four rotor arms, two on the left which turn counterclockwise, and two on the right which turn clockwise. Each rotor cuts three concentric kerfs by means of a core barrel, an intermediate kerf arm, and an outer kerf arm. Detachable bit holders on each cutter arm carry six tapered shank bits. Bit arrangement is such that the bits are not loaded more than ½ in bit per bit. Shovel plates on each arm move cut coal from the outside to the middle up the conveyor throat. Machine width at the operator's position is 7 ft, 6 in, a space designed to permit ample movement alongside. Provisions have been made for adding hydraulic pumps driven by the main motor to operate a hydraulic roof drill. In addition, space has been provided along the right side of the tractor tread to operate a drill and thus permit the installation of roof bolts ahead without shutting down the borer. A slip clutch and a disengaging clutch permit operation of hydraulic functions without the rotor arms or the cutting chains running. Goodman says the Type 300 is available for DC or AC with one motor to power all machine movements. Goodman Mfg. Co., Halsted St. & 48th Place, Chicago 9, Ill.

Continuous Mining Machine Designed For 28- to 44-In Seams

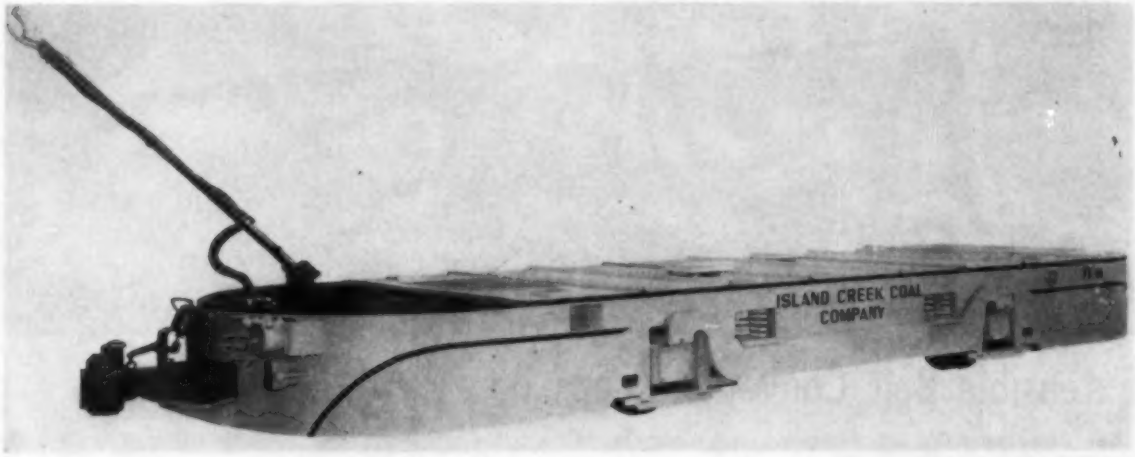
Manufactured by the Jeffrey Mfg. Co., Columbus, 16, Ohio, the new Type 86-A Colmol has a mining width of 14 ft 7 in for seams ranging from 28 in to 44 in. The 86-A Colmol is designed to discharge mined coal into a bridge conveyor from which the coal is delivered to a pan conveyor. The 86-A is one of four Colmol units.





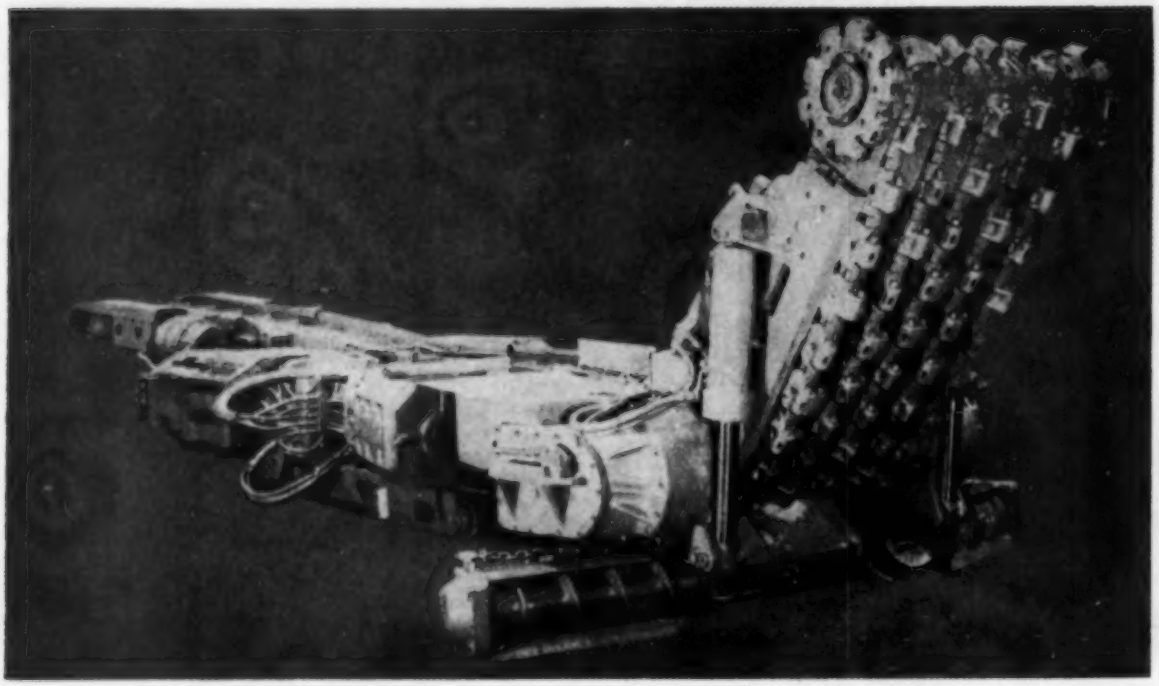
Extensible Belt Conveyor Assures Constant Flow

An extensible chain conveyor manufactured by Wilcox Mfg. Co., is regarded by Wilcox as the "missing link to true continuous mining." These features, the results of tested design, are pointed out by the company: 1) no down time for panning up during a shift; 2) an assured continuous flow of coal from the face to the outside with no difficulty; 3) more working hours per shift; 4) higher continuous tonnages. Address: Wilcox Mfg. Co., Box 217, Raleigh, W. Va.



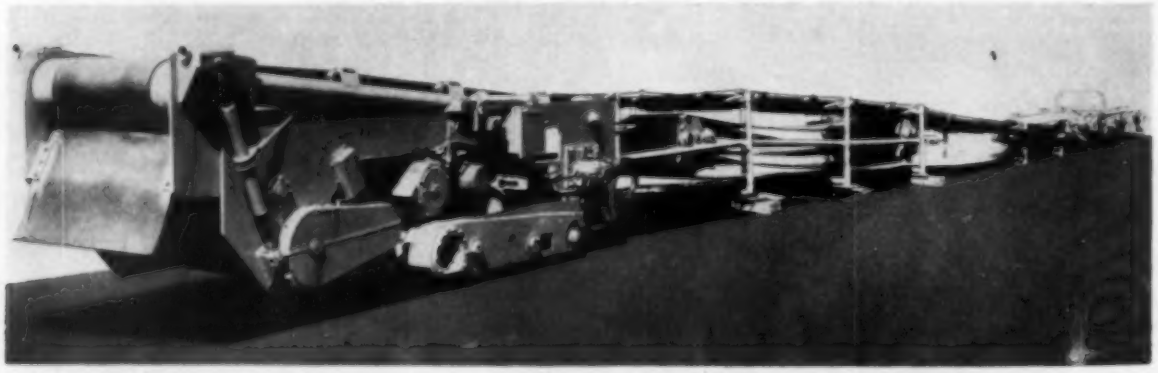
Low-Height Mine Locomotive Designed For Low Coal

A low-height mine locomotive being exhibited by General Electric and Island Creek Coal Co. was developed primarily for higher production from low coal. The locomotive operates at 11 mph at its rated drawbar pull, but is designed to operate at 13 mph with shunted fields on the traction motors. Maximum speed is 30 mph, overall height is 29 in. Roller motor axle bearings, full magnetic control, provision for uncoupling at either end, and separable tandem features are provided. The unit was manufactured by GE's Locomotive & Car Equipment Dept.



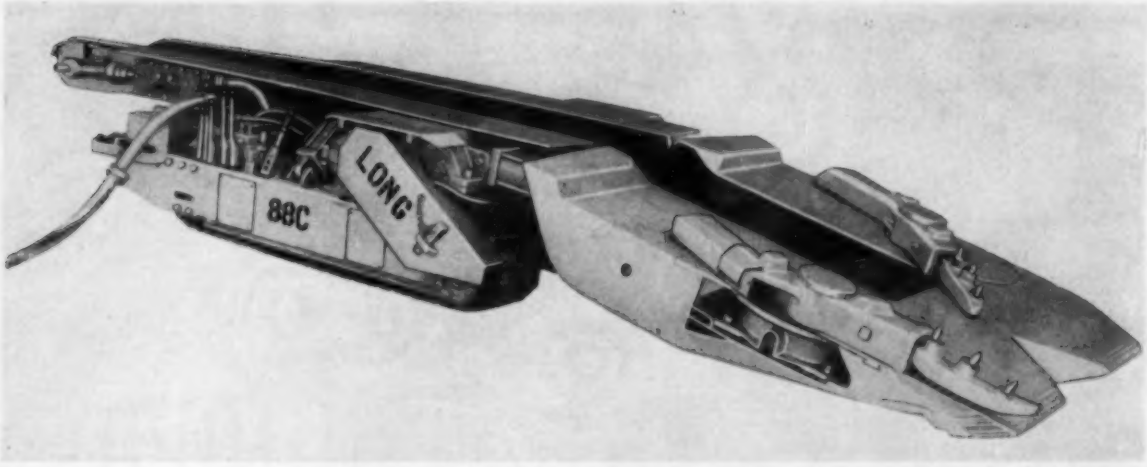
Miner Cuts Coal At 4- to 5-Tpm Rate In Low Coal

The new Joy 5-CM mines seams as low as 38 in and delivers 4 to 5 tpm. Joy says the miner, which is 32 in high, will work up to 82 in from a mine floor. With each sumping operation the miner enters 24 in into the face. Its ripping and conveying systems move ahead as a single unit during sumping. Constructed without a hopper, the 5-CM moves coal away from the face with a 29½ in chain conveyor. Other features: increased power, hydraulic tramming.



Extensible Belt Conveyor Keeps Pace With The Face

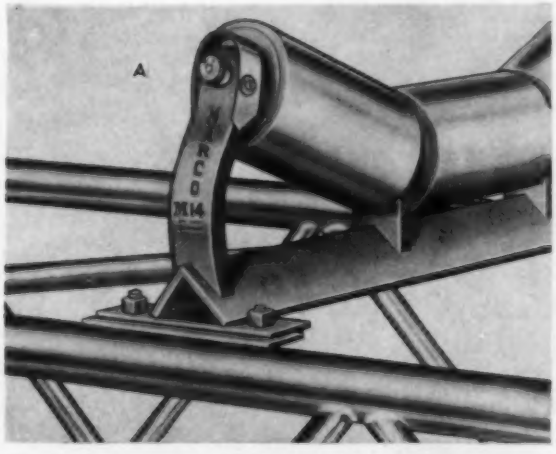
The Ropex extensible belt conveyor, manufactured by the Goodman Mfg. Co., is a 36-in wide conveyor that increases or shortens its own length under its own power while running coal. Linked to any continuous miner or loader it keeps pace with the face, eliminates delays and interruptions of a continuous flow of coal to the out-of-the-mine transportation system. The conveyor also provides for as much as 200 ft of belt storage for 100 ft of advance before adding belt. Along the line Ropex has no heavy structural framing, and no rigid idler assemblies. The belt rides on linked idlers suspended between parallel wire ropes anchored to the head section and payed off storage drums on the tail section. Coal reportedly moves quickly and smoothly from tail to head with no jolts or bumps to cause shifting or spilling. During extension (1,000 ft maximum) or retraction, loaded or unloaded, predetermined tension on the belt and wire ropes is automatically maintained. A motor-driven bridge conveyor between the tail section and loading equipment swivels from right or left, and has a 13½ ft range of forward and back travel. The discharge height at the head can be adjusted, and Goodman reports that there is no need for cribbing or support. Open construction of the belt storage framework at the head section permits belt to be added quickly and easily, the company adds.

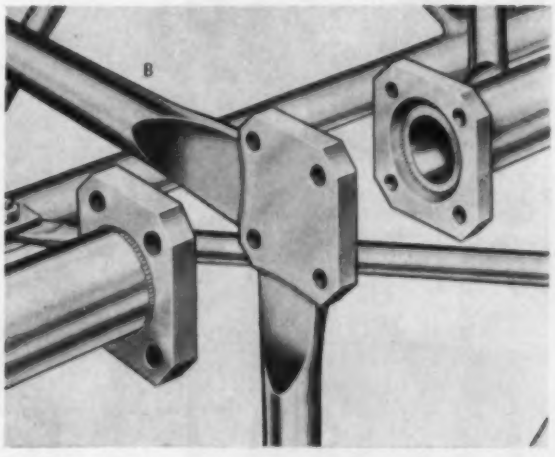


Low Height, High Capacity Loading Machine

Designed with a maximum operating height of only 25¾ in, the Model 88-C is the lowest height, high-capacity loading machine on the market, according to the manufacturer, the Long Co., Box 331, Oak Hill, W. Va. Constructed specifically for the "Piggyback" conveyor system of mining, the 88-C has a rated capacity of 4 to 6 tpm. Its single 40-hp motor drives all machine operations, and is linked to combined gear and chain drives. All functions are controlled hydraulically from a single bank of finger-tip control valves. Tramming speed is 95 ft per min, weight is 14,000 lb.

A complete list of manufacturers' exhibits appears on p 102.



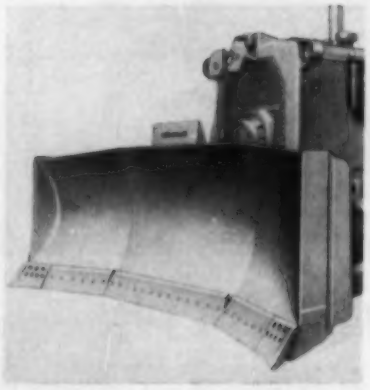


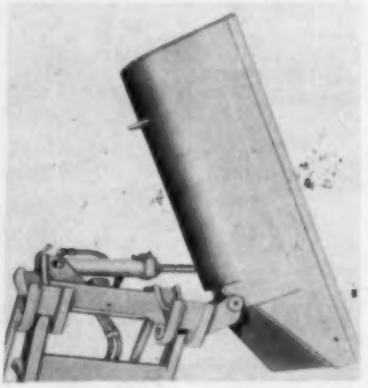
Tubular Frame Conveyors Designed to Increase Belt Life

In an engineering effort aimed at saving expensive belt repairing, the E. F. Marsh Engineering Co., St. Louis 10, Mo., has introduced Marco tubular frame conveyors with four belt protection features—a wider frame, wider face pulleys, all-tubular members (A), and rigid joint construction (B). If uneven loading, wind, and factors beyond control cause a belt to wander, the conveyor offers an operator protection against belt edge damage, according to the company. The tubular frames provided 3½ in of space between a belt edge and the nearest frame members. Pedestal type return idler brackets are used rather than hanger brackets, which, the company says, confine and damage belts. Rigid joint construction is maintained by using four bolts in each connection or 16 in each joint. The results are: resistance to frame misalignment, simple belt training, and increased belt life, according to the Marsh Engineering Co.

300-hp Engine Powers 50-Ton Truck

The old and the new, specifically a 1917 Dart truck and a 1957 coal hauler, are being exhibited by the Dart Truck Co., 2623 Oak St., Kansas City 8, Mo. The 1917 truck, retired to an antique dealer's shop in 1930, is powered by a 27-hp engine. The 1957 coal hauler is the Model 50S-BDT bottom dump unit. Powered by a 300-hp diesel, the 50S-BDT is equipped with an Allison torque converter and transmission. Added features: a 25,000-lb front axle and a 100,000-lb drive and trailer axle. Its trailer will hold 61 cu yd. struck, 69 cu yd heaped, according to the manufacturer.

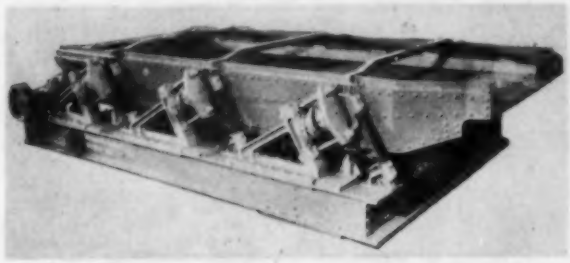




Tractor Tools Designed To Rip, Load, Push

Three recent earthmoving tools developed by Caterpillar Tractor Co., Peoria, Ill., are the 9U bulldozer, (A), the No. 9 ripper (B), and a side-dumping bucket attachment (C) for Caterpillar Traxcavators. The 9U bulldozer is recommended for stripping and coal handling. Its design permits it to retain large loads on long-distance moves because of a straight

center section and two side sections angled forward. Overall width is 14 ft, 10 in. The No. 9 ripper, designed specifically for the Caterpillar D9 tractor, penetrates 28 in with its three teeth. The teeth, when not in use can be pinned out of the way. The side-dump bucket permits Traxcavators to load, transport and dump material without turning, a method designed to increase production through reduced loading time. A hydraulic cylinder mounted on the bucket carriage swings the attachment into a side-dumping angle of 60 deg.

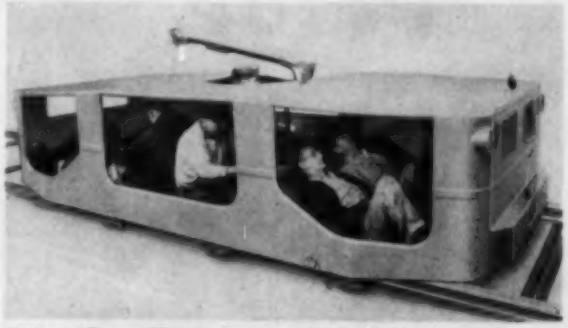


Resonance Vibrating Screen

The first American showing of the Meckum-SKB resonance vibrating screen is being exhibited by Meckum Engineering, Inc., Ottawa, Ill. Among the screen's features: extreme low power consumption, controlled frequency, and controlled amplitude. Reportedly, the Meckum resonance screen has made obsolete most other types of vibrating screens in Germany because of the unit's high screening efficiency and speedier materials separation. Meckum Engineering is manufacturing and selling the unit by agreement with Schuchtermann & Kremer-Baum, Germany.

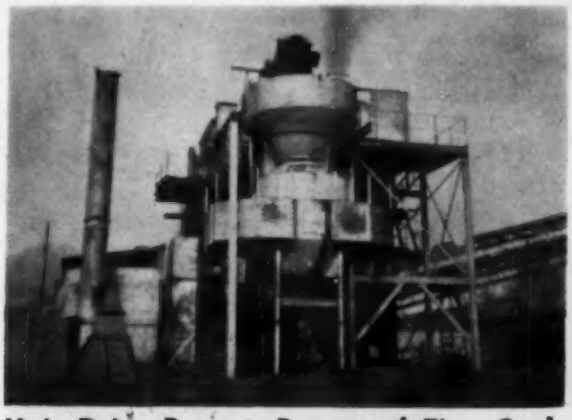
Horizontal Highwall Auger Drill

A new and heavy duty horizontal high wall auger drill which bores 8-in and 9-in holes in hard rock formations with augers and drag bit, or with augers and air-operated tricone heads, is being introduced at the Coal Show by the Salem Tool Co., manufacturer of McCarthy earth and rock drills.



Mine Bus Transports 13 Men

A new portal bus named the "Low Type" Model TJ5 is being exhibited by the Lee-Norse Co., Charleroi, Pa. Reportedly a "very improved vehicle," the bus is powered by a single traction motor drive, is 90 in wide, 37 in high above a rail, and 14 ft 7 in long. The bus will carry 13 men, including an operator. Lee-Norse has equipped the unit with airplane type disc hydraulic brakes on each axle, as well as with a hand-operated dual cast-iron shoe parking brake.



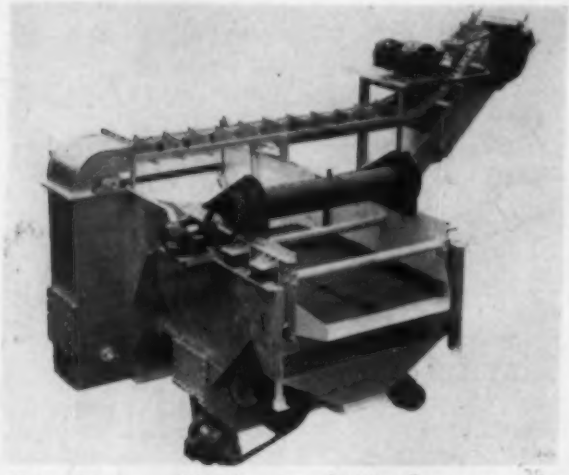
Unit Dries Raw or Processed Fine Coal

A Holmes Baughman fine coal dryer manufactured by Robert Holmes & Bros., Inc., dries centrifugal and filtered coal to the lowest desirable moisture level, according to the company. The dryer was specifically designed to dry raw coal or coal in the ¼-in range that has been processed in present day filtering, centrifugal, and other types of dewatering equipment. A full size model at the Coal Show is being used to point up the unit's features—low initial operating costs, thorough, uniform drying, and a large capacity. Address: 510 Junction Ave., Danville, Ill.

Miner Designed For Low Coal Cutting

The newest product development at Lee-Norse Co., Charleroi, Pa., is the Model LCM-26 "Low Coal" miner, a 26-in high unit that is designed to cut coal seams from 30 in to 40 in with a flat roof. The miner cuts a place 14 ft wide, according to Lee-Norse. The unit's appearance at the Coal Show is the first, anywhere. However, from information learned at Lee-Norse, the LCM-26 is designed with a "very new and

improved" gathering mechanism for loading cut coal. Further, it uses a new cutting and ripping principle never before used on a Lee-Norse unit.



New Heavy Media Coal Washer

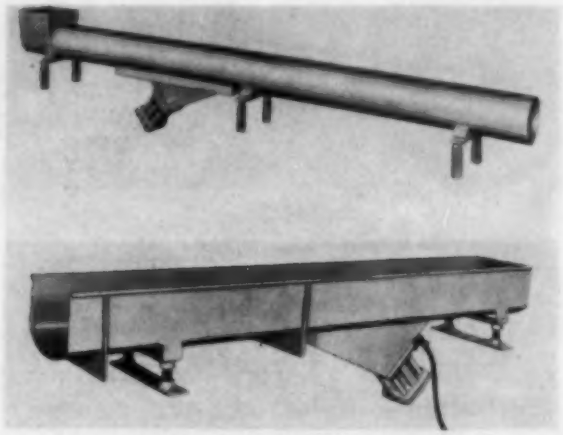
Fuel Process Co.'s new heavy media coal washer is designed with a number of advantages, according to the company: 1) low power consumption 2) increased capacity, 3) constant circulating head, 4) an improved distribution of flow to control middling blocks of near-gravity material. All this is accomplished, says Fuel Process, by using an integral heavy media recovery screen, a built-in lowhead, high volume, heavy media circulating pump, and an original design of the heavy media circulating system.

'Biggest, Heaviest' Motor Grader

The Galion Iron Works & Mfg. Co., Galion, Ohio, manufacturer of the T-700 Grade-O-Matic motor grader, says the unit is the world's "biggest, heaviest and most productive." The T-700 is equipped with the company's Grade-O-Matic drive, which utilizes a GM-Allison torque converter and power shift transmission. The maker says the grader was designed for "tremendous push-power" at the blade. Total weight of the T-700 is 40,125 lb; it is powered by a 190-hp Cummins diesel.

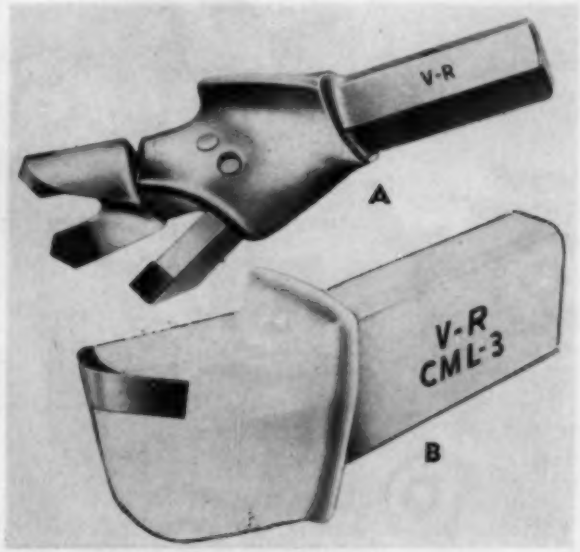
Petroleum Products and Service

A new product and a new service by Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa., are the company's Petro-engineering service for customers and Gulfcrown lithium base, multi-purpose grease. Gulf's Petro-Engineering service offers practical assistance on any problem or process involving fuels, lubricants, or other petroleum products. Through the service Gulf customers are able to get Gulf's engineering and research facilities working for them. The new lithium base grease is designed to meet nearly all industrial lubrication requirements that require a variety of special greases, e.g. high and low temperatures, water action, high-speed bearing action, and long storage.



Pneumatically-Driven Vibrator Feeder

A vibrating feeder that creates its vibrating force with a pneumatic drive mechanism rather than with electric vibrators or motors is being manufactured by the Cleveland Vibrator Co., Cleveland, Ohio. Made completely of metal, the feeder will reportedly operate under conditions that are "impossible for conventional equipment." High temperature, corrosion, and other applications that would normally damage conveyors will not damage the Cleveland model, according to the manufacturer. Only one moving part appears in the drive mechanism, and there are no cams, bearings, belts, and gears. Its enclosed construction is designed to seal out dirt.



Three New Bit Designs

A number of new bits are being introduced by the Vascoloy-Ramet Corp., Waukegan, Ill. Among them—a new series of "Pilot Hole" bits for use in air blast hole drilling

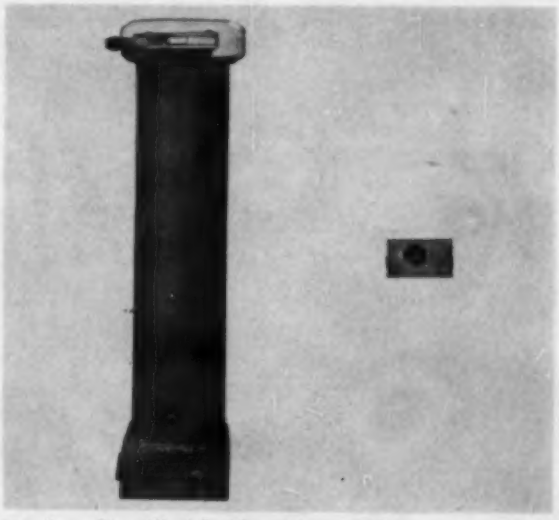
(A); a "Suction Bit" for roof drilling; and a CML bit for rotary type machines (B). The "Suction Bit" for roof drilling is the percussion type as opposed to the standard rotary style. It is designed with a four-hole design for introduction of air and suction return of cuttings. The CML bit for rotary type machines features a "lip-tip" which cuts its own clearance. In addition it is designed with a flange type shank for more rigid holding in the chain.

Truck-Mounted Rotary Blast Hole Rig

Reich Bros. Mfg. Co. is introducing a truck-mounted Model 750 rotary blast hole rig. Like the crawler-mounted unit in the photo above the new rig is capable of putting 38,000 lb down-pressure on a bit to drill 9-in blast holes. The new machine is designed with a "top drive hydraulic rotary drilling system," a Reich feature, as well as "infinitely variable rotation speed," another Reich feature which permits an operator to select the "correct" rotation speed for the formation being drilled. The crawler-mounted rig, which will sink 50-ft holes without changing steels, was designed by Reich Bros. when confronted with a request from the Tasa Coal Co., for a drill to sink deep holes and work close to a high-wall.

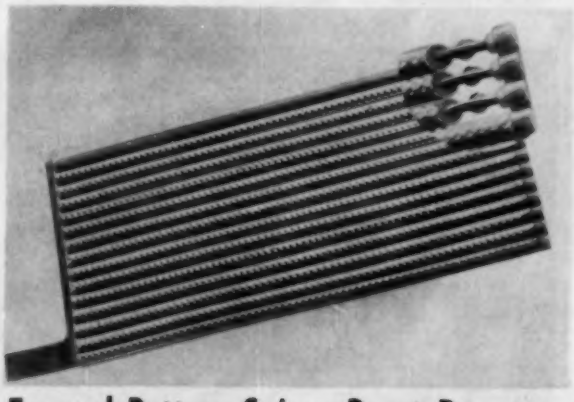
Tapered Shank Bit For Bore Type Miners

The Kennametal U7T tapered shank cutting bit is designed to establish full contact with the walls of bit block holders used with boring type mining machines. Hammered into place the bit is held so firmly that the tendency to wobble during severe boring reportedly is eliminated. The result is increased service life of both the bit and the block, and the bit's cut is more accurate and maintains more consistent clearances. The bit's taper automatically sets the bit gage, and changing bits requires less than half the time required for conventional setscrew type holders.



Hydraulic Fluid-Cleaning Filter

Schroeder Bros., Box 72, McKees Rocks, Pittsburgh Pa., has developed an integrally relieved line filter which, accompanied by another development dubbed the "Tattletale," offers a continuous cleansing of hydraulic fluid. Visual warning by means of the "Tattletale" indicates when the filter should be replaced. Adaptable to any volume, the filter's cartridge can be changed easily.



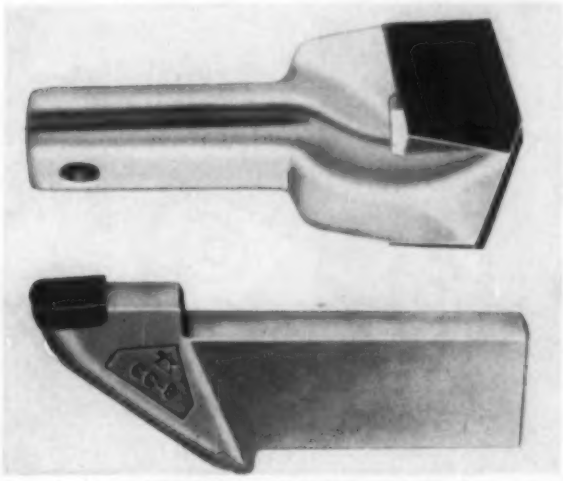
Encased Battery Spines Boost Power

A new motive power battery development by the Exide Industrial Div., Electric Storage Battery Co., reportedly permits packing more power into a given space. The power packing results from using armored porous tubing (photo) to encase Exide's Silvium grid spines and active material of a battery's positive plates e.g. the new TG Exide-Ironclad, which holds 44% more power than it did 3 yr ago.

Mine Lighting System

A mine lighting system which has the approval of the U. S. Bureau of Mines is being exhibited at the Coal Show by Mine Safety Appliances Co., 201 No. Braddock Ave., Pittsburgh 8, Pa. The system is a fluorescent one, and has re-

sulted in greater worker efficiency and higher morale, plus safety, during trial installations. MSA reports that the system which uses 14-w fluorescent lamps hung vertically at spaced intervals, distributes light evenly.

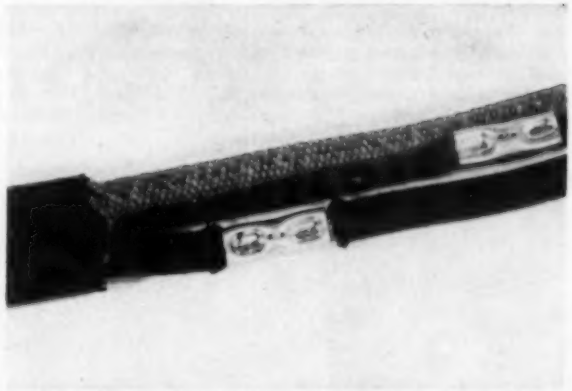


Roof Bit, Machine Bit Introduced

Among the Carboloy mining tool developments of General Electric's Metallurgical Products Dept. are two new bits—a low cost roof drilling bit known as Style PTV, and a heavy duty machine bit known as the CC-8. The PTV roof bit is equipped with what the company describes as the "most wear-resistant carbide insert of any comparable tool in the field." The CC-8 machine bit is designed with a negative rake and is for use in continuous mining operations where hard-to-cut formations exist.

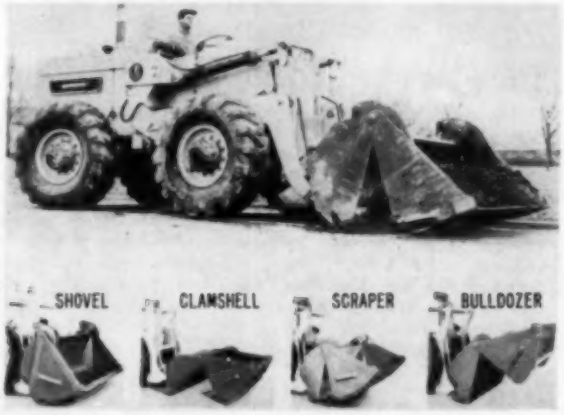
Non-Skive Hose Fittings

Parker Appliance Co.'s new non-skive type Hoze-Lok fittings for rubber-covered, wire braid hose for hydraulic applications is reportedly easy to use since it is unnecesary to skive the rubber hose cover for fitting. Four different connecting ends are being offered by the company: 1) a swivel nut type to mate with a standard Triple-lok 37-deg flat end; 2) a male pipe thread end; 3) a straight thread end with an o-ring for mounting in an SAE straight thread boss; 4) and a standard Triple-lok 37-deg flare end. The fittings are made in sizes to accommodate hose from 3/16- through 2-in inside diameters. They are re-usable.



Cable Splice Will Take 6,000 lb-Pull

Emergency repairs and permanent splices on flexible mine cable from No. 8 through No. 4/0 reportedly are made quickly and economically with the Hylink connectors exhibited by Burndy Corp. The company says that repair splices will stand pullout strengths higher than 1,600 lb, and that permanent connections will stand strengths higher than 6,000 lb. Burndy points out that finished connections are smaller in diameter than the joined cable. Thus, the connections will pass through sheaves and overreels.



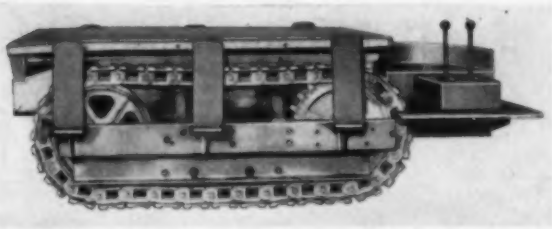
Bucket Qualifies As Tool Four Ways

The Frank G. Hough Co., Libertyville, Ill., is manufacturing the Drott "4-in-1" bucket as optional equipment for Models HU, HH, and HO Payloaders. The bucket is named the "4-in-1" because of its design which permits it to be used as a shovel, clamshell, scraper, and bulldozer. Another Hough bucket is a 2.4 cu yd capacity unit recently introduced.

Diesel Operates On Low-Cost Fuel

The White Diesel Engine Div.'s Model 40 "Superior" engine is an industrial diesel capable of operating exclusively on low-cost fuel. Developed in ratings up to 1,025 hp, the engine is being produced in naturally aspirated and supercharged models. It is designed for use with heavy equipment and in industrial plants as standby power units. White says the Model 40 has been proven an "extremely economical operation" in 4- to 10-yd shovels. It has also been designed for portable generator sets to 600 kw. Outputs from 215 to 1,025 hp represent a 50% increase over the top previous output of 700 hp. The Model 40 in the 1,025-hp class

is the same size as the old 700-hp model. Address: White Diesel Engine Div., the White Motor Co., Springfield, Ohio.

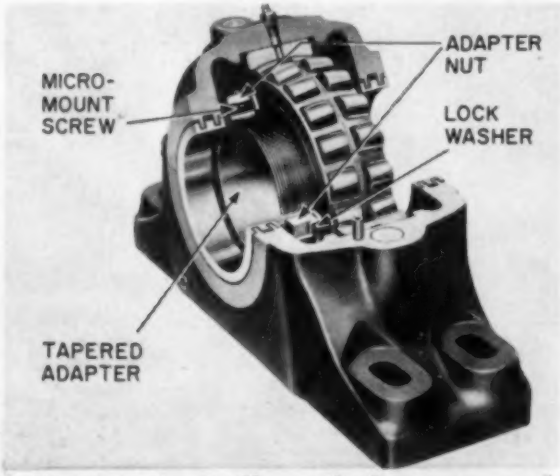


Self-Propelled Track Type Utility Truck

Schroeder Bros., Box 72, McKees Rocks, Pittsburgh, Pa., is the manufacturer of a small caterpillar-mounted, self-propelled vehicle for service uses. Its basic measurements of 36 in across the treads, 23-in height, and 80-in length can be varied within limitations to accommodate a given job. Schroeder recommends the vehicle as a service car for roof bolting, dust collector carrying, stoper carrying, etc. Designed to accommodate a hydraulic saw if required the vehicle also has a power take-off for operating a hydraulic coal drill or other portable hydraulic tools. The manufacturer points out that the unit, which it calls a track-type utility truck, is able to work in sections with continuous miners, since its cat treads will permit it to move in badly rutted shuttle car sections. In addition, the truck can be equipped with a cable reel.

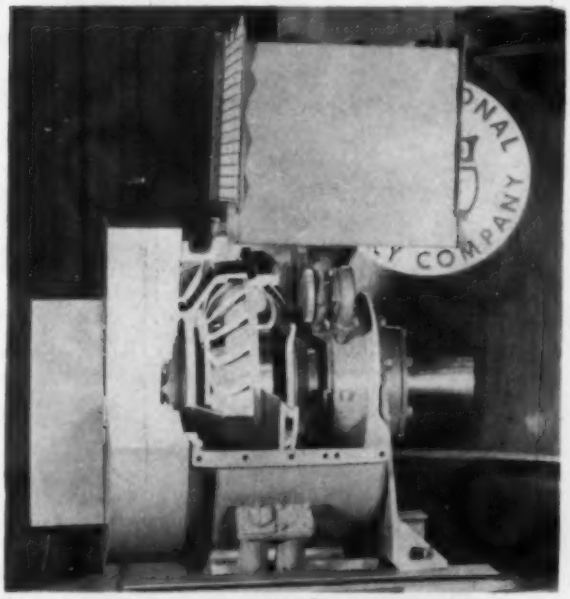
Shuttle Cars Embody Advanced Design

National Mine Service Co.'s "Torkar" AC and DC shuttle cars are the result of new performance and maintenance standards established by National Mine during 4 yr of testing and field use. The cars embody the company's most advanced design and engineering. Other National Mine Products: a newly developed Hayden belt splicer for hand operation and a production splicer for mechanical splicing.



Roller Bearing Pillow Blocks

A line of spherical roller bearing pillow blocks manufactured by the Dodge Mfg. Co., Mishawaka, Ind., has been designed with what the company calls "a unique mounting feature." The mounting feature is "Micro-Mount," a method in which Dodge's "Spher-Align" bearing can be seated on shafts quickly and easily. This is how "Micro-Mount" works: set screws have been situated parallel to the bore in the adapter nut (photo). After a bearing is snugged up with the adapter nut, adjustment is completed by turning the "Micro-Mount" screws against the locking washer until, bearing, adapter, and shaft form a unit. Dodge recommends its "Spher-Align" pillow blocks especially for applications where self-alignment and ease of installation are needed. A feature of the unit is a design that permits lubricant to enter at the center of the bearing, then move outward along all bearing surfaces. Drain plugs permit use of either grease or oil and provide flushing.



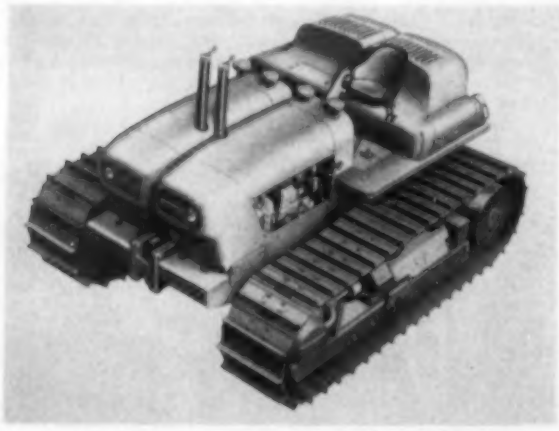
Torque Converter Made In Six Sizes

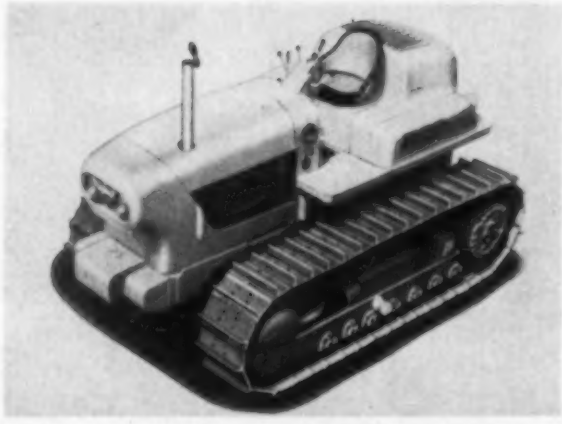
National Supply Co.'s torque converter is one of six basic sizes made by the company to provide 17 power capacities between 100 and 1,000 hp. The three hydraulic elements—pump, turbine, and stator—are constructed of aluminum alloy castings. The 17 power capacities, which are provided in closely spaced ranges, are designed to match exactly engines and electric motors.

Self-Propelled Air Compressor

Acme Machinery Co.'s Model 275-A4J (photo) is a four-wheel drive, self-propelled air compressor equipped with stoper arms. It is also equipped with four-wheel steering and can deliver better than 275 cu ft of air compressed to 100 lb. Acme says the unit has been designed for mines with steep grades and poor bottom conditions. Optional equipment: cable reel, stopers and dust collectors, stoper arms. Acme's Model HSJ-4WD Jumbolter is designed for mines with stationary compressors and piped air. The model's features: four-wheel drive, four-wheel steering. It is designed for use as a stoper jumbo, but is being offered without drills as a utility car. As

a utility car it enables an operator to haul roughly 300 roof bolts and all accessories needed for a complete shift of roof bolting. Added features are hydraulic tramming and full power steering. Acme Machinery address: Box 1169, Williamson, W. Va.



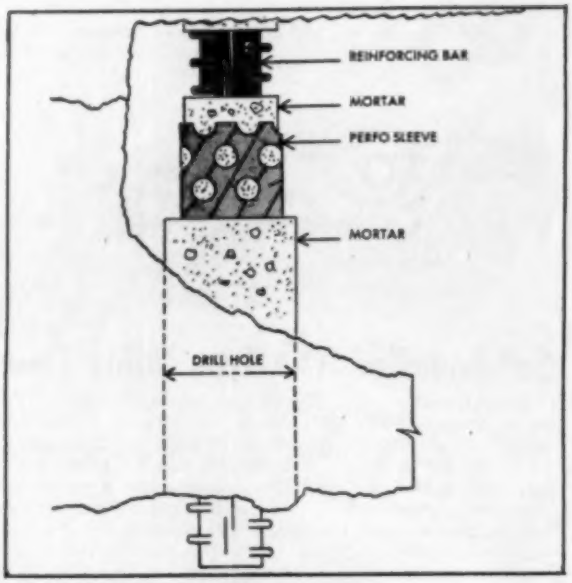


Single, Dual Engine Crawlers

The Euclid TC-12 twin-power crawler is powered by two 218-hp engines for a total of 436 combined horsepower. Of this a total of 416 hp is delivered to the power train. The unit is equipped with separate Torqmatic drives for each track, a design which gives it easier steering, maneuverability, and greater drawbar pull at faster ground speed. The 218-hp engines represent a boost in power. From the 190-hp rating the TC-12 engines held 2 yr ago. Another crawler, Euclid's C-6, in effect, is a half section of the Model TC-12. The C-6 is powered by a single 218-hp engine, delivering 208 hp to the power train through an Allison Torqmatic drive. Change from one speed range to another is made under full power with no loss of momentum. The C-6 is designed with no master clutch, and its top maneuvering speed is more than 8 mph.

All-Purpose Grease

Poco HT-EP grease, manufactured by the Pure Oil Co., Columbus 15, Ohio, is a multi-purpose grease intended to do more efficiently the work of many ordinary greases. Pure Oil says that Poco HT-EP greases can be used under wet or dry conditions, and over a wide range of loads, speeds and temperatures. They are inhibited against oxidation, contain extreme pressure properties, and have high temperature resistance.



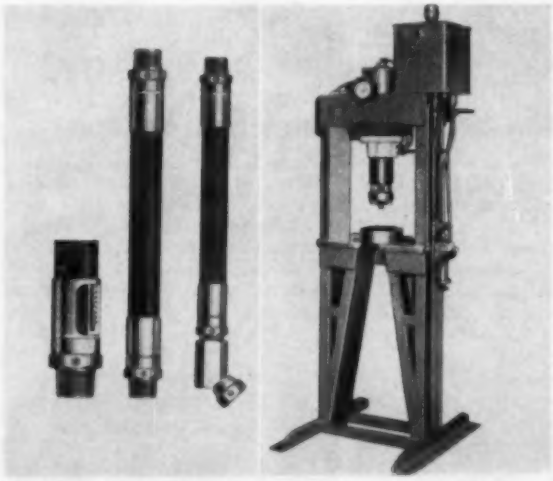
Roof Bolting With Cement

The Perfo roof bolting system developed by the Sika Chemical Corp., 35 Gregory Ave., Passaic, N. J., consists of a perforated steel sleeve that is filled with mortar, then placed in a drill hole. A steel reinforcing bar is driven into the sleeve to force the mortar through the perforations and fill the space between the sleeve and the surrounding rock. Sika Chemical points out these advantages when the system is used: 1) uniform anchorage is obtained because the steel bar is fully embedded in high strength mortar along its entire length. Thus, there is no play and thrust is resisted in all strata; 2) uniform stress is achieved because uniform anchorage between the bar and the walls of the drill hole is the result of a chemical process (hardening of cement); 3) no corrosion appears.

3-Yd, ¾-Yd Excavators

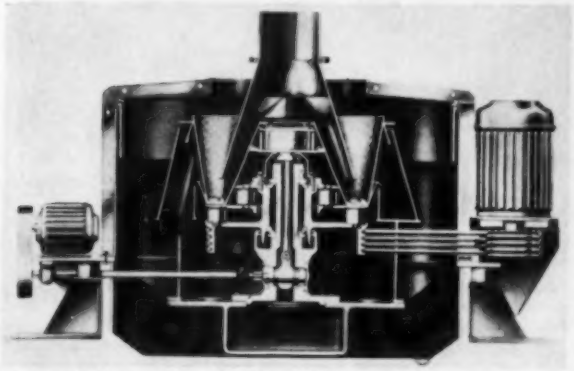
The Koehring Co., 3026 West Concordia Ave., Milwaukee, Wis., is demonstrating its stripping shovels and other excavators in coal field applications. Included will be the two new

sizes of excavators introduced recently by the company—the Model 1205 (photo) with a 3-cu yd capacity, and the Model 305 with a ¾-yd capacity. The 1205 is the latest and largest convertible excavator being built by Koehring. Its lifting capacity is 95 tons at a 75% rating, and its standard shovel attachment combines a 30-ft boom with a 22-ft dipper stick. Converted to a crane, the 1205's 60-ft alloy steel boom can be extended to a maximum 180 ft, plus an additional 30 ft of jib boom. The 1205 is fully convertible from shovel to lift crane and dragline or clamshell operation. The model 305, introduced in 1956 as a truck-crane excavator, will lift loads to 25 tons and travel at a speed of 30/2mph. As a crawler-mounted unit, the 305 will lift 15 tons, and is adaptable for any type crane operations—lift, clamshell, dragline, grapple, magnet, and pile-driving. For high lift service the standard 30-ft boom can be replaced with a 100-ft boom. Included in the unit's design are self-cleaning crawlers.



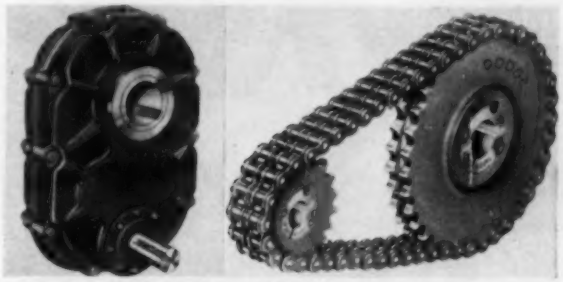
Hydraulic Swaging Machine

A new hydraulically-operated swaging machine manufactured by the Weatherhead Co., Fort Wayne Div, Fort Wayne, Ind., provides any quantity of hose assemblies with permanently attached ends. Weatherhead says the machine is designed to handle any size ends and any length in minutes.



Oscillating Centrifugal Dryer

A full-size Bird-Humboldt oscillating centrifugal dryer constructed with all its interior parts visible is being exhibited by the Bird Machine Co., South Walpole, Mass. The dryer is said by Bird to deliver one ton or more per min of fine coal dewatered to less than 5% moisture with 98% solids recovery. In addition the maker claims almost no degradation, only ¾hp power input per ton, and screen life in excess of 2,000 hr. The dryer, according to the company, dewaters for less than 1c per ton. Screen replacement cost is reportedly well under ½c per ton, and screens are changed every 4 to 6 mos instead of every few days.



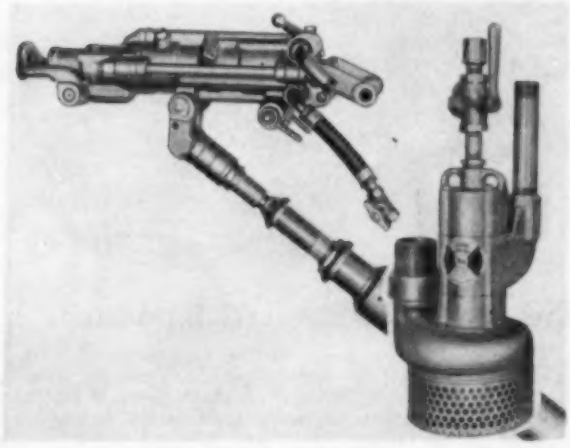
Reducer, Chain Sprockets Introduced

The newest in the Dodge line of torque-arm speed reducers is the No. 9 double reduction reducer which is rated at 100 hp at 100 rpm for shafts up to 5 in. The new size represents a substantial boost in the horsepower capacity of the Dodge line, since previous models were rated at a maximum horsepower of 60. The No. 9 is used in the same way as the smaller Dodge reducers, which are mounted directly on a shaft rather than conventional mountings. The advantage, according to Dodge, is the elimination of flexible couplings, belt take-up, and reducer foundations. The Dodge Mfg. Co. (home office: Mishawaka, Ind.) points to these features in the No. 9 reducer: rugged design, easy installation, torque arm belt adjustment; a backstop to prevent reversal of rotational direction; and an overload release to protect the driven machine, motor, and reducer. Another Dodge product is the double-strand roller chain sprocket that requires no reboring or machining for shaft installation. As an addition the company's "Taper-Lock" line, the sprocket's design permits users to buy sprockets and bushings of the desired shaft size, then mount them without reboring, key-seating and set-screw machining.

Industrial Lamps Offer Variety

A number of industrial lamps, including the newest mercury vapor lamp (photo), are being exhibited by the Radiant Lamp Corp., 300 Jelliff Ave., Newark 8, N. J. Among them are high intensity hard glass mercury vapor lamps in three light patterns—narrow, medium, and wide beam; tubular hard glass spatterproof and rough service lamps; weather-

proof, hard glass types to 2000 w; reflector types using standard and high voltages (to 275 v) with wattages from 150 to 1500; and reflector type long neck lamps using standard and high voltage. In the photo above is the R-60 made by Radiant. The lamp is a 400-w, mercury vapor, hard glass, weatherproof unit.



Air Leg Drill, Stoper, Sump Pump

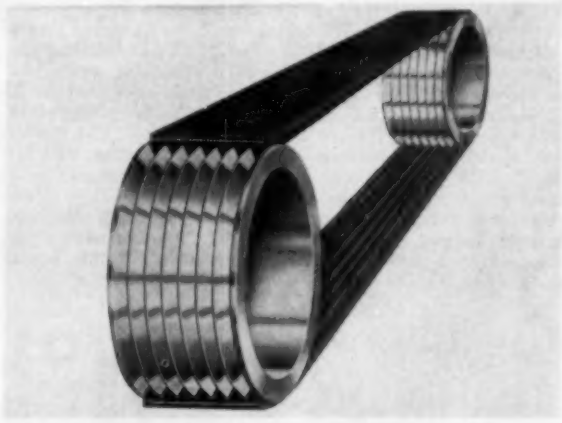
The LeRoi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis., is exhibiting a new air leg sinker rock drill. The unit, designated the AL92B, is being shown with these other new products manufactured by LeRoi Div: the S12V stoper, the 0T11 tamper, a line oiler, and the LP340 sump pump.

Fire-Resistant Conveyor Belting

"Pyroprene," a conveyor belting manufactured by the Hamilton Rubber Mfg. Corp., Box 361, Trenton 3, N. J., has been fabricated with three main qualities, according to the maker: 1) fire resistance 2) oil resistance 3) and mildew resistance. The belting has been accepted by the U. S. Bureau of Mines under fire resistance acceptance designation USBM 27-7.

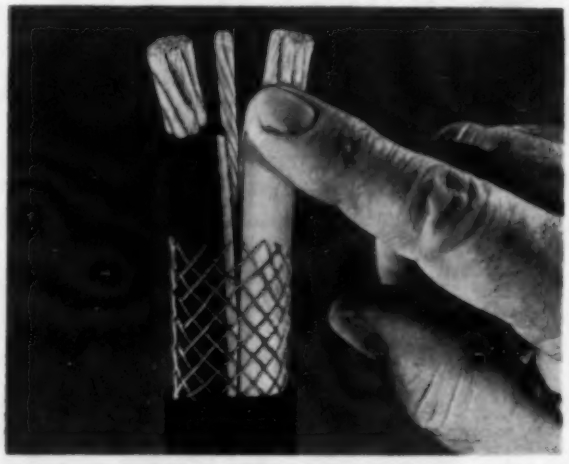
Closed Circuit Television System

General Electric's Monochrome Intra-Tel closed circuit television system, Type TE-3-A, produces black and white pictures and transmits them from the scene of activity to remote locations through a coaxial cable or microwave, rather than by broadcasting waves. The system produces a picture on a monitor, a composite video output to operate a remote monitor, and an RF modulated ouput to operate one or more standard television receivers. The RF output is adjustable to channels 2 to 6.



New Drive Eliminates Belt Matching

The new "Poly-V" drive manufactured by Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J., consists of a new type belt with specially designed pulleys to mate with the ribs in the belt. The design eliminates matching, is said to have greater strength, and to maintain constant pitch diameter and speed ratios. In addition says the manufacturer, space is saved and wear is reduced. In one case the replacement of standard V-belts with a 5½-in wide Poly-V drive on a Jeffrey centrifugal fan reduced the weight of sheaves by 1,000 lb. Bearing troubles were eliminated.



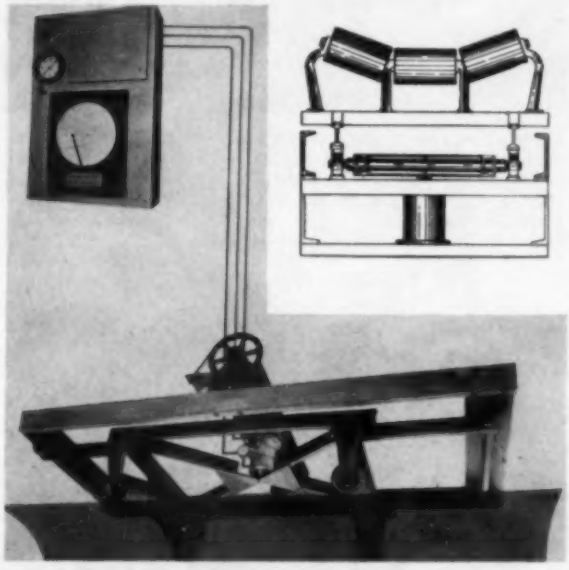
Cable Has 50% Grounding Wire

A new shuttle car cable constructed with a 50% grounding wire is designed to provide peak electric protection by its manufacturer, Anaconda Wire & Cable Co. Flat strand construction permits more cable on a reel and also prevents broken wires if the cable is crushed in runovers. Named "Securityflex," the cable is insulated with high-grade neoprene that has been improved to resist puncture, flame, and crushing.

High Pressure Portable Rams

Templeton, Kenly & Co., Broadview, Ill., has a new line of "Remotrol," high pressure, two-way, portable, hydraulic

rams. Built with ratings from 10 to 600 tons capacity, the rams are recommended for solving maintenance jobs economically—i.e. pulling and installing heavy gears, wheels, pinions, sprockets, pulleys, frozen keys. The company points out the advantages of "Remotrol" portability. The units are made with solid heads, with center-hole heads, and with hand pumps, electric power pumps, gasoline power pumps, and air power pumps. Other new products: the A1022, 10-ton, lightweight aluminum mechanical ratchet lowering jack; the ROL-TOW foot lift hydraulic jack in Models 10-, 25-, and 50-ton capacities; the No. 642, 6-ton, geared screw type and 139A, 5-ton plain screw type mine timber jacks.



Pneumatic Belt Conveyor Scale

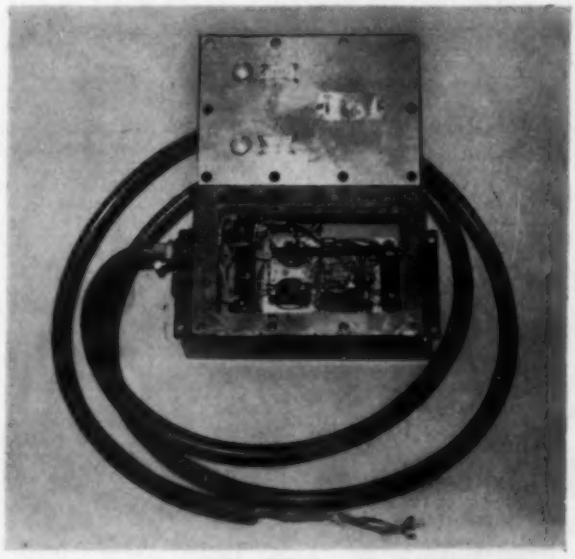
A pneumatically-operated conveyor belt scale constructed as a conveyor section by Industrial Physics & Electronics Co., Salt Lake City, Utah, contains at least two improved design features: 1) because ball bearings are used in the unit's self-aligning pillow blocks only that motion perpendicular to the direction of the belt is transmitted to the pneumatic scale; 2) the complete weighing mechanism can be placed under a belt, and no structures above the belt are necessary. Another Industrial Physics product is the "Detramp" tramp iron detector which consists of a sensing unit placed around or under a belt, and an amplifier-detector unit which sounds warnings or stops a belt. The "Detramp" can be installed in a few hours and will detect most high manganese steels.

Floodlight Improved By Maker

A new model of the General Electric L-69 general purpose floodlight, the L-69A, provides more light per unit, more power than the L-69. Three beam spreads permit a selection for specific application.

Ground Fault Protection, Rock Duster

Two types of ground fault protection devices manufactured by the Central Mine Supply Co., give users identical protection, differing only in space requirements. Type F "Protecto" is installed inside existing controller compartments, while Type E "Protecto" (photo) is completely enclosed in an explosion-proof compartment which can be mounted when space is not available in existing controller compartments.



Another Central Mine Supply product, a liquid rock duster machine, is designed and intended for use in wet rock dusting on shift behind mining machines and continuous miners. Thus, rock dusting can take place close to the face.

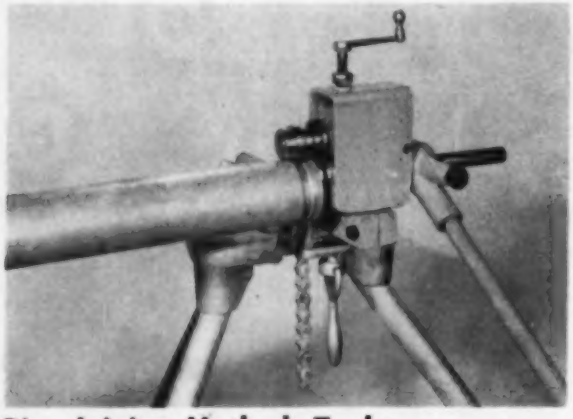
Illuminated, Oil Tight Push Button

An illuminated, oil-tight push button manufactured by General Electric reportedly eliminates the need for indicating lights on a control panel. Features: all-angle visibility, long-life 6-v bulb, panel mounting, back mounting, made with or without guard.

Drills 24-Ft Hole With No Steel Change

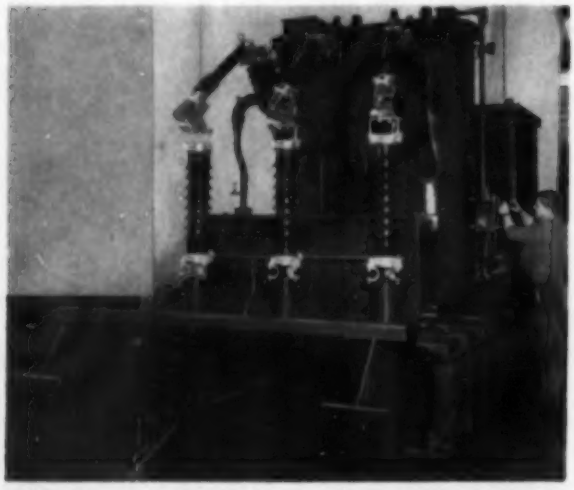
Davey Compressor Co.'s M-8AL rotary drill is equipped with special drill bars and masts that can drill 24 ft holes without changing steels. Suitable for mounting on any standard truck, the M-8AL utilizes both compressed air and high pressure water for drilling. The drill has a rated capacity of 6¾-in holes up to 600 ft with air, 1,500 ft with mud. Its compressor for air blast drilling is a Davey 500 cfm unit. Its high pressure water pump is a heavy duty duplex type. Both compressor and pump are driven by a GMC-471 engine

mounted on the truck bed. A five-speed transmission permits operation of the drill at its most efficient speed. Davey Compressor recommends the Model M-8AL for shot and blast holes, structure testing, and core drilling.



Pipe-Joining Method, Tools

The "Vic-Easy" method of piping initiated by the Victaulic Co. of America, Elizabeth, N. J., features "Vic-Easy" portable grooving tools for forming a groove in the ends of light wall pipe or tubing, both aluminum and steel. The method removes no metal yet provides a positive lock of pipe ends.

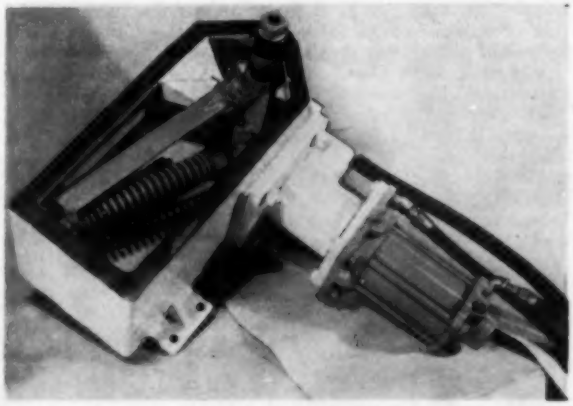


Skid-Mounted Power Substation

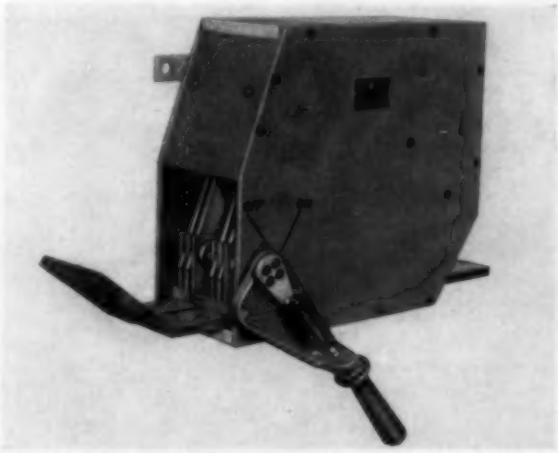
A substation built by General Electric's Power Transformer Dept., Pittsfield, Mass., is mounted on skids for pulling over rough terrain. The unit is a complete substation equipped with transformer, switchgear, and lightning arrestors. Incoming power at 34,500 v can be stepped down to 4,160 and 2,400 v, then carried to a shovel via cable.

Air-Powered Switch Thrower

An air powered track switch thrower manufactured by The American Mine Door Co., Canton 6, Ohio, is for mines where only compressed air is available or preferred. Named the "Canton Aero Switch," the thrower is said to have all the mechanical advantages of the company's electric model.

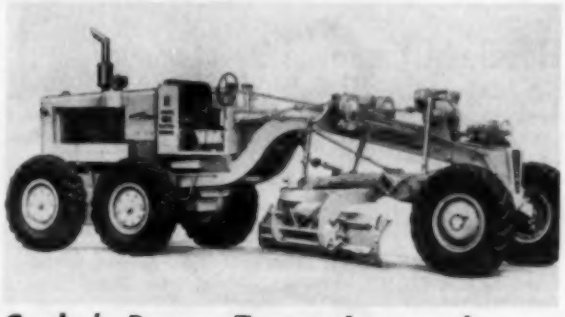


In fact, the only difference is the substitution of an air cylinder for solenoids. American Mine Door offers the thrower as an all air-controlled device using the company's Model "E" manual contactor, or as an AC- or DC-controlled device using the Model "C" or "D" manual contactors in conjunction with an air power control cabinet.



3,000-Amp Safety Switch

Among the newest products manufactured by Ohio Brass Co. is a 3,000-amp feeder safety switch (photo), a locomotive current collector, a roof support expansion unit, and a hanger insulation tester.



Grader's Power, Torque Increased

The Adams "Power-Flow" 660 motor grader manufactured by LeTourneau-Westinghouse Co., Peoria, Ill., is designed

with the same basic features as the standard Model "660," but has two important new features—a torque converter drive train and a 27% increase in engine power. The new 660 teams a 190-hp diesel with a single-stage torque converter and a four-range constant mesh transmission. By tripling available torque, the drive system reportedly provides the equivalent of an infinite number of gear ratios which adjust automatically to variations in load requirements. An exclusive feature is the "Power-Flow" 660's forward-reverse rocker pedal, which permits an operator to reverse direction without hand shifting. As a result the operator can shift from any of four forward speed ranges (.23 mph to 27.4 mph) to any of four reverse speed ranges (.22 mph to 24.4 mph).

Diesel, Gasoline Units Can Be Swapped

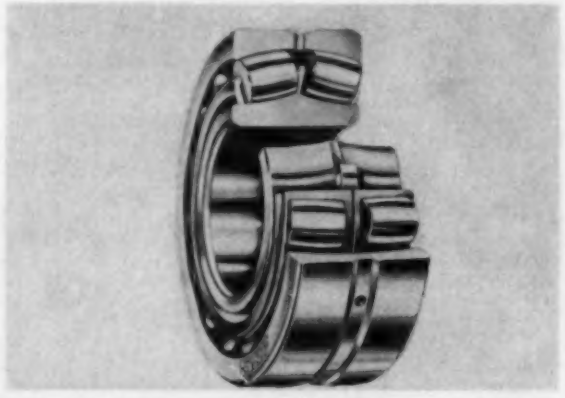
Hercules Motors Corp., Canton, Ohio, is the manufacturer of a new line of interchangeable gasoline and diesel engines made in 18 different bore sizes. The gasoline models are designated the G. O. series, the diesels the D. D. series. Hercules considers the diesel and the gasoline models twins, since they have the same appearance and the same mounting dimensions in engines of the same cylinder size. In addition, most component parts in both are identical. In all, 90 engine models are made by the company in ratings from 3 to 500 hp. Another Hercules line is a new power unit (photo), which will accommodate the G. O. and D. D. engines, as well as the popular sizes of the L-head gasoline and turbulence chamber diesels made by the company.

30-Ton Hauler Represents New Design

LeTourneau-Westinghouse Co.'s 30-ton truck, the LW-30, is the company's first entry in the truck field and represents a bid to depart from conventional truck design. For example, the LW-30 body rides on air rather than on steel springs. In place of springs LeT-Westinghouse has installed giant pistons. Conventional axles, too, have been eliminated because the truck's suspension system makes them unnecessary. In addition, a special steering system eliminates conventional low-handling tie rods by using a design that shifts all steering linkage up and within, or above, the truck's frame. The result of this last feature gives the LW-30 double the usual ground clearance. The truck's wheelbase is 5 ft shorter than most 30-ton haulers, a feature, says LeT Westinghouse, that makes the truck so maneuverable that it will turn a complete circle 43-ft in diameter, or approximately the same circle turned by many passenger cars. A new engine, a 375-hp Cummins, powers the LW-30.

Roof Control Drills

Three roof control drills introduced by J. H. Fletcher & Co., 332 So. Michigan Ave., Chicago, Ill., are the Fletcher Model DJ dual roof control drill, the Model DL narrow roof control drill (photo), and the Model DK miner roof control drill. The Model DJ is a new twin-drill machine with double independent slides for installing roof bolts on centers up to 12½ ft across a mine entry. The Model DL is an all-new single drill unit with a slide to install bolts 4½ ft between centers. It is designed to operate alongside boring type continuous miners. The Model DK consists of a pair of new style roof drills for mounting on continuous miners. It is equipped with special flex-mount and machine-to-roof masts for greater stability in bolting.



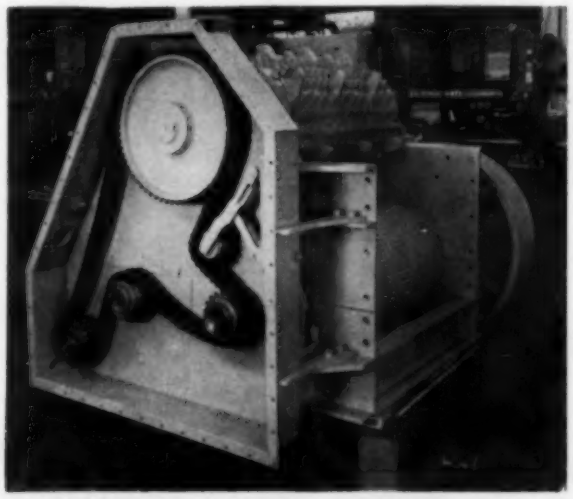
Bearing Has Central Lubrication

SKF Industries' improved Type C spherical roller bearing is designed with a new central lubrication feature. The company says the Type C represents a major improvement in the internal design of spherical roller bearings, and service life is increased 2 to 3½ times more than any other design made. All sizes of the Type C now have positive lubrication. This is accomplished by means of a circumferential groove situated in the center of

the outer ring's outside diameter. Equally-spaced holes are drilled in the groove. This permits a lubricant to move around the groove and through the holes in the outer ring flushing away old lubricant, abrasive dust, dirt, and moisture.

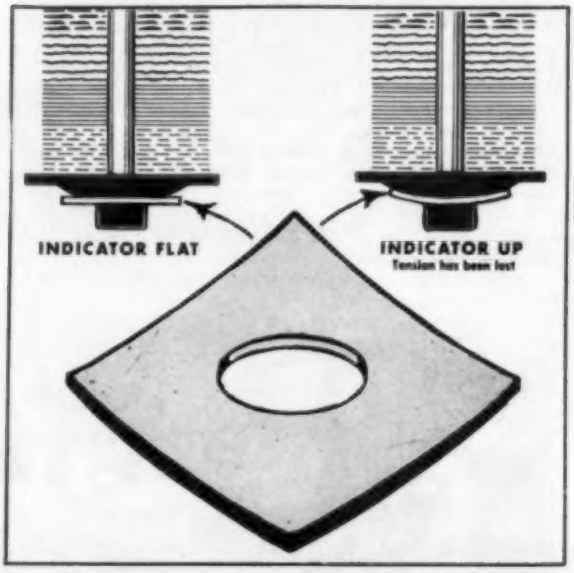
Taper Shank Bit Holders

One of the newest products at the Cincinnati Mine Machinery Co. is the recently developed line of holders for use with taper shank carbide bits. The holders are for use on the Jeffrey Colmol, the Goodman continuous miner and the Joy continuous mining machine. Various types of lugs have been designed. Among them are the individual lug (photo A), which can be utilized on miner drum heads as well as certain types of boring arms. Another is an assembly made from individual lugs which can be welded to the arms of the Colmol or Goodman miner (photo B). A third is a removable type head for use in the outer positions of the Colmol arms requiring six positions in a single head (photo C). The base of the holder is welded permanently to the arm. The head portion carrying the bits is positioned by two tongues, then held in place with two large hollow-head cap screws. The bits are removed either by wedging underneath the projection of the head or in the slots at the base of the upper portion of the holder. Address: Cincinnati 25, Ohio.



Triple Roll Crusher Meets All Needs

McLanahan & Stone Corp.'s new triple roll crusher is designed to meet present day needs of both the large and small coal operator. The unit contains a two-stage triple roll, but employs the single roll and double roll principles of reduction. McLanahan & Stone points out that the crusher is designed for high capacities and that it will accept larger feed than conventional two-stage crushers. The crusher is also built with reportedly foolproof hydraulic adjustment and tramp iron protection. Its roller chain and sprocket drive run in an enclosed oil bath. Added features are self-aligning roller bearings and various tooth designs. Hollidaysburg, Pa.



Roof Bolt Tension Indicator

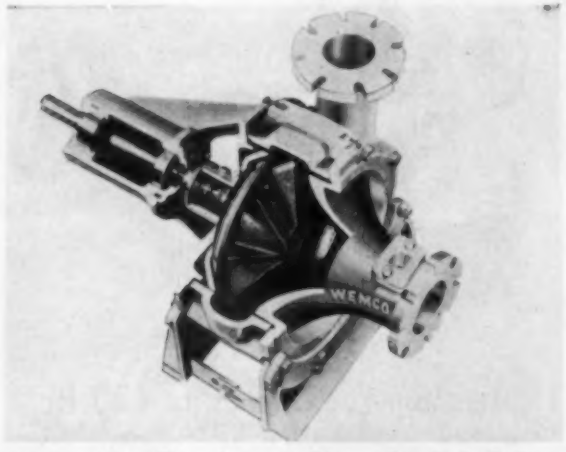
A visual tension indicator which shows whether roof bolts have been properly installed and stressed is being featured by the American Mine Supply Co., 404 Frick Bldg., Pittsburgh, Pa. Two types are made—a yellow unit that indicates 8,000 lb tension and a white unit that indicates 8,000 lb. When roof bolt tension and anchorage have been lost the eyes of the indicators, which are installed on every third row of bolts, turn up.

Ammonium Nitrate Blasting Agent

Atlas Powder's new ammonium nitrate blasting agent is said by the company to have greater density and to provide better dispersion of oil. In addition the agent, which is named Atlas Granules, reportedly delivers better propagation than conventional types of "fertilizer grade" ammonium nitrates. During the Coal Show, Atlas is demonstrating the importance of "oxygen balance" in ammonium nitrate blasting agents. Address: Concord Pike & Murphy Rd., Wilmington, Del.

Heavy Duty Continuous Miner Tool

Firth Sterling's new CMC heavy duty continuous mining tool is specifically designed for bore type continuous miners. The CMC bit is designed with a heavy duty head to resist extreme side pressures, and with a large self-gauging shoulder on three sides, a feature which is said to assure positive seating and minimize holder damage. Address: 3113 Forbes St., Pittsburgh, Pa.

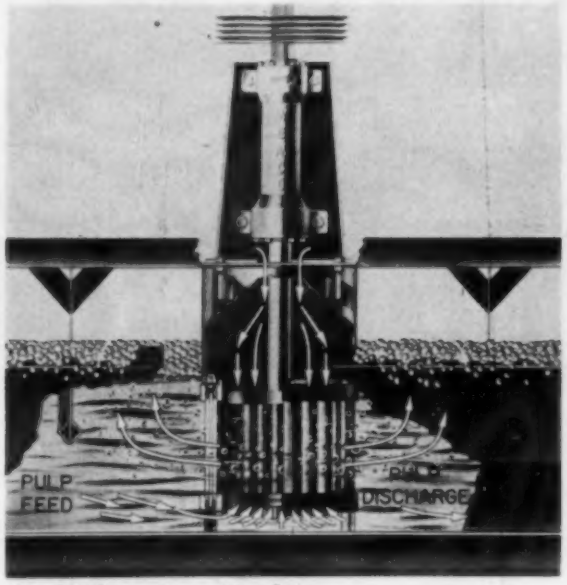


Pump Handles Large Size Coal Solids

Three main features of a new solids pump for handling coal are pointed out by the manufacturer, Wes'ern Machinery Co., 650 5th St., San Francisco 7, Cal. The first, and perhaps, the main feature is that the pump will handle large size solids without plugging. The second is coal particle handling with no degradation. And the third, a maintained rate of performance despite abrasive conditions.

Low Impact, High Capacity Table

A two-deck washing table designed and produced by the Deister Concentrator Co., Fort Wayne, Ind., reportedly doubles washing table capacity per unit of floor space. Designated the Concenco "77" diagonal deck coal washing table, the unit is designed with two decks suspended by cables, and with the head motion connected rigidly to the deck assembly. Thus, a "floating" design is achieved, which is said to eliminate so much impact that lighter buildings can be constructed to house batteries of the tables.



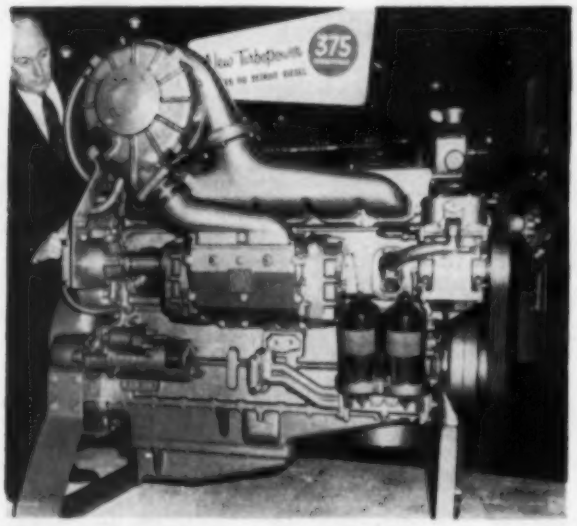
Coal Flotation Machine

Western Machinery Co.'s coal flotation unit is designed to produce a deep, dense column of coal-bearing flotation froth. The unit's name is the "Wemco" Fagergren. Western Machinery is exhibiting a 44-cell at the Coal Show, in addition to a laboratory-size cell to demonstrate test procedure and to examine the inner design of the unit. Company address: 650 5th St., San Francisco 7, Cal.

6-Yd Tractor Shovel Lifts 30,000 Lb

A 6-yd tractor shovel made by the Construction Machinery Div., Clark Equipment Co., weighs 56,000 lb, will lift 30,000 lb while stationary, and carry 15,000 lb at 4 mph. Designated the Model 375A, the tractor shovel is powered by a Cummins turbo-charged 375-hp diesel and is part of Clark's "Michigan" line. Another "Michigan" tractor shovel, the 175A (photo), will

convey 2¾ yd and is equipped with a high-lift bucket. Its weight is 21 tons, its speed 28 mph.



Engine Smaller, Power Output Higher

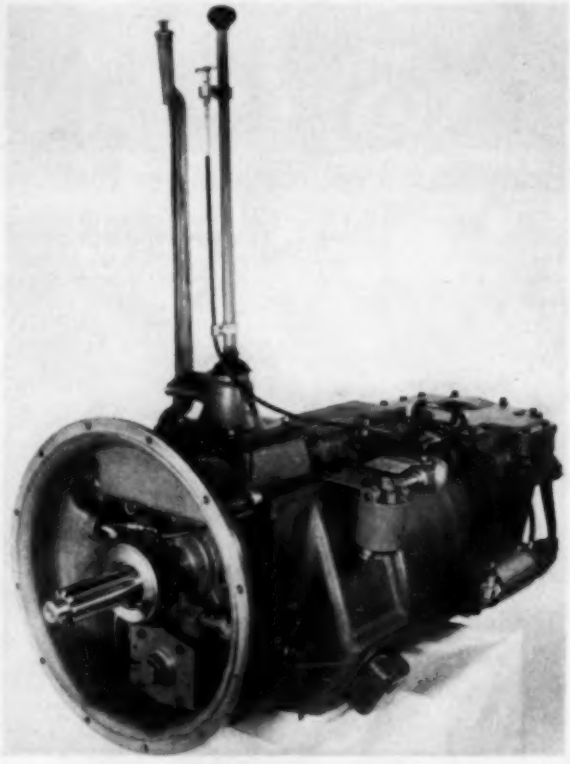
Increased efficiency plus horsepower increases up to 25% with no increase in weight-to-horsepower ratio are the chief results of Detroit Diesel's development of its new Series 110 375-hp diesel. A six-cylinder engine that utilizes an exhaust-driven turbine and air impeller to supplement its cylinder air supply, the Series 110 has been developed to meet demands for high power output in a relatively small, light package.

51-Ton Coal Hauler

A 51-ton coal hauler, the 24TDT-128W, is being shown at the Coal Show by the Euclid Div., General Motors Corp., Cleveland, 17, Ohio. The hauler's tractor is powered by a Cummins Model NVH, 12-cylinder diesel that delivers 360 hp at 2,100 rpm. The tractor's transmission is a Fuller 10F-12Z20 with 10 speeds forward and two in reverse. The hauler's trailer is equipped with a bottom dump hopper designed for a struck capacity of 67 cu yd, a heaped capacity of 76 cu yd with a 3:1 slope. An air-controlled, mechanical door-closing device operated by a two-way air valve closes the hopper's bottom dump. Gravity opens it. The entire hauler is designed to draw a payload of 102,000 lb or 51 tons. Its front axle is rated at 22,300 lb, its drive axle at 67,250 lb, and its trailer axle at 73,250.

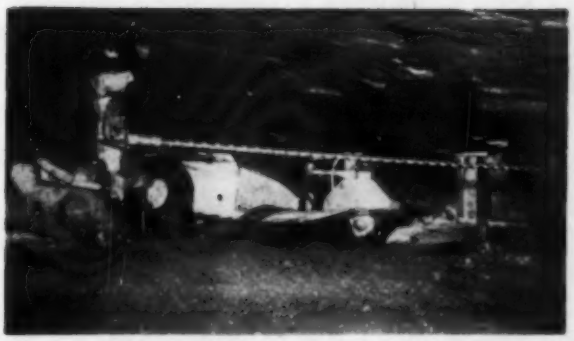
Shovel Design Permits Lift Choice

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., is already producing the Type 1250 standard shovel, a unit equipped with a 28-ft boom, a 22-ft dipper handle, and a 3-cu yd bucket. As a high lift shovel, the 1250 is delivered with a 45-ft boom, a 32-ft dipper handle and 2½-cu yd bucket. Optional: two widths of crawlers, two lengths of crawlers, two widths of crawler treads, lighting plants, and two types of rigid gantries. The 1250 is constructed with a one-piece carbon steel cast rotating and truck base, fabricated steel machinery frames, machine-cut gears, steering controlled by gear type jaw clutches, heat-treated alloy steel ground shafting, and large diameter clutches and brakes. The company points out that the 1250 is designed to permit a knockdown for haulage into units of less than 60,000 lbs. In addition, diesel or electric power plants are available with or without torque converter drive. Address: Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio.



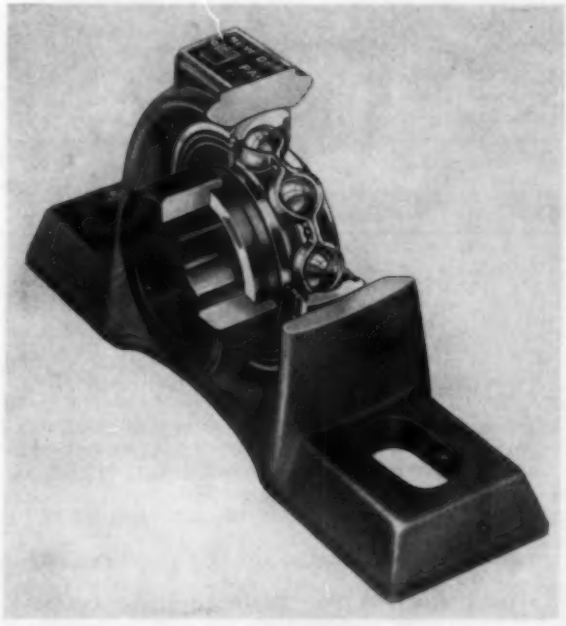
Transmission For Engines To 600 Hp

Fuller Mfg. Co., Kalamazoo, Mich., is exhibiting its biggest and newest semi-automatic RoadRanger transmission, the Model R-1550. The transmission is designed specifically for extremely heavy-duty, off-highway service, and for engines up to 600 hp. Nine forward and two reverse speeds are offered. To ease shifting the Model R-1550 is equipped with a pre-selective countershaft brake which is air-ac ivated. In the R-1550 (and in Fuller's R-1150) one shift lever controls all forward and reverse speeds. The company says at least one-third less shifting is needed, a feature that results in less operator fatigue. All range shifts are pre-selected, automatic, and synchronized. Ratios in both RoadRangers average 38% between steps, with four forward speeds provided in low range, and four provided in the high ranges. A total of nine forward speeds in the R-1550 (and the R-1150) are secured by using a four-speed shifting pattern—the first pattern with the auxiliary section in low gear or low range, the second with the auxiliary section in high gear or high range.



Unit Makes Drilling A One-Man Task

The Long Co. Model 2355 tractor drill reportedly makes coal drilling a one-man mobile operation. Constructed of aluminum, the unit's drill (No. 1M-20) is said to be the lightest weight unit of its type ever manufactured. A high operating pressure of 2,000 lb permits high torque and high speed with lower gallonage and smaller, lighter hose. The Long Co. says the 1M-20 drills average holes in 12 to 20 sec. For drilling larger holes or drilling in hard coal, the company recommends the No. 1M-30. Especially designed for use with the 1M-20 and 1M-30 are the Long TD-8 and TD-16 hydraulically driven tractors, which can be utilized with a trailer for supply haulage or conveyor pan movement.

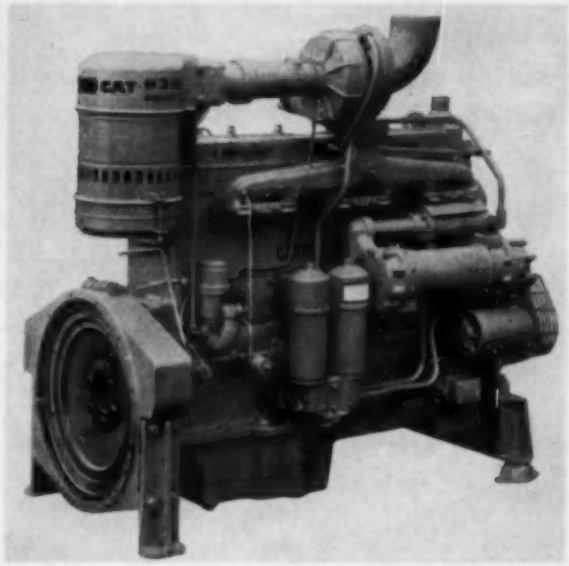


Interchangeable Pillow Blocks

A line of pillow blocks that are interchangeable with all the sizes being manufactured now are being produced by the New Departure Div., General Motors Corp., Bristol, Conn. New Departure is producing the line in bores ½ in to 2 5/16 in.

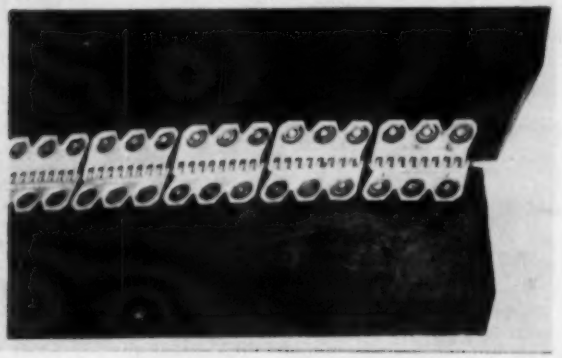
'Failure-Free' Pump

The Gorman-Rupp Series 80 pumps, the newest made by the company, are being offered as a unit which gives buyers "freedom from pumping failure." The company has designed the Series 80 simply and with fewer parts than usual. It points out these new design features: Lighter weight, straight in suction, no check valve, and a mechanical shaft seal. The Series 80 is being made in sizes 1½ in, 2 in and 3 in. Solids will not foul the pump, according to Gorman-Rupp.



Industrial Engines Light, Powerful

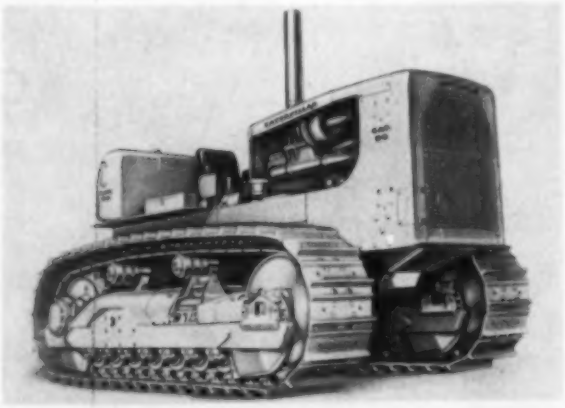
Caterpillar's newest industrial engines consist of two redesigned models, the D318 (Series G) and the D315 (Series G), in addition to the all-new D353. Both the 315 and the 318 (photo) are lighter and smaller than earlier units. Either can be naturally-aspirated or equipped with a turbocharger. The 318 develops 137 hp at 2,000 rpm, but will develop 175 hp with a turbocharger. The 315 delivers 91.5 hp naturally-aspirated, 115 hp with a turbocharger. The third of Caterpillar's new engines, and perhaps, its newest of all, delivers up to 390 hp at 1,300 rpm. For intermittent industrial service it will produce 340 hp at 1,200 rpm. When powering a matched generator the 315 will generate 200 kw. Turbocharged for efficiency, it is a six-cylinder unit.



Fastener Developed For Extensible Belt

Flexible Steel Lacing Co. is manufacturing a hinged belt fastener developed especially for joining the new extensible belts that trail continuous miners. Designated No. 375, the fastener is separable, makes a tight joint to minimize sifting, and is fully reversible. A nylon cable hinge pin is used for joining. Complete joints for various widths of belts are being

made, and the manufacturer has developed an aligning holder to simplify application of the fastener.



Tractor Redesigned For Power Boost

Redesigned with an engine horsepower boost of 12%, Caterpillar's D9 track-type tractor delivers 54,200 lb of drawbar pull. The power from its six-cylinder engine is channeled through direct drives to six speeds, both forward and reverse, up to 7 mph. With a torque converter three ranges forward and two in reverse deliver speeds up to 7.8 mph. Flywheel horsepower of the D-9 is now 320, compared to 286 on the preceding model. Drawbar horsepower, too, is higher—260 now, 230 on the earlier model. When used with a No. 9S bulldozer blade, the D9 can move up to 9 yd of material with each pass.

31-Ton Dozer Packs 375 Hp

The "Michigan" Model 380 Turbo-Dozer weighs 31 tons, packs 375 hp, and was introduced this spring by the Construction Machinery Div., Clark Equipment Co. The machine has full power steering and a road speed higher than 30 mph.

Single Deck Uses Two Screens

Barber-Greene Co.'s exhibit of the new "Duo-Screen," a German development, will demonstrate what the company calls "a most unusual motion." The screen is actually two screens in one and reportedly has been successful in separating wet and sticky materials, which would normally require a heated screen. "Dup-Screen" provides dual motion in a single-deck screen by interlacing two screens and moving them individually.

32-Yd Bucket Made of Special Alloy

A 32-cu yd dragline bucket made with Becoloy—a special steel alloy developed specifically for dragline service—is being exhibited by the Bucyrus-Erie Co., South Milwaukee, Wis. The Becoloy line was introduced in 1956 in three types and in several sizes—the BL for light digging in materials with penetration resistance, e.g., gravel or clay; the BM for medium digging in bulky material, e.g., shale or cemented material; and the BH for heavy duty digging. At the time of introduction Bucyrus-Erie said that the buckets would be constructed with either solid or perforated baskets. Other features of the Becoloy group, the company points out, include a high bucket arch for wide opening and clearance and a "slicing action" lip for penetration.

More . . .

A 375-hp, V-type, eight-cylinder diesel manufactured by the Cummins Engine Co., Inc., Columbus, Ind.

Fireproof trolley taps and cable protectors, plus a new line of JIC hydraulic hose fittings made by Standard Devices Co., Cleveland 22, Ohio.

JCM-1 miner chains made by the Frank Prox Co., Inc., Terre Haute, Ind.

A new chock prop exhibited by Kurt Orban Co., Inc., Greenwich, Conn., holds a load up to 80 tons. It is designed to replace wooden chocks. The difference between the new prop is a design of larger floor and roof plates.

Coming . . . In June

Supplementing this preview of the products to be presented at the American Mining Congress Coal Show, Coal Age will present in the June issue a summary of all the papers and discussion at the nine technical sessions of the convention, covering continuous mining, conventional mining, coal preparation, strip mining, management, and safety.

Changing the new Kennametal Taper Shank Bit is easy with a drift wedge at knock-out shoulder or bottom of shank. Inset shows a Kennametal Taper Shank Bit.

New KENNAMETAL* Taper Shank Bits provide faster, easier bit changing . . .

give additional time for coal production

Kennametal offers you a new taper shank bit to be used on any boring type mining machine, such as the Jeffery Colmol illustrated above. This bit can be replaced easily in nine seconds when it becomes dull (as shown in illustration at right). Machine operators keep sharp bits in the machine because it's so simple and fast to change them. You save valuable production time and help insure top man and machine efficiency.

The Kennametal Taper Shank Bit gives full shank contact with the special bit holder made by the Cincinnati Mine Machinery Co. Bit wobble is eliminated. Wear on the shank and holder is reduced and more accurate clearances are cut. A strong taper connection holds the bit to accurate gage and firmly against the work.

Set screws are not needed with this new bit. There are no screw threads to wear or dull points that cannot hold the bit in place.

Why not put this new taper shank bit to work for you? Get in touch with your Kennametal Representative. He can tell you about the many advantages Kennametal mining tools offer you. Or write to KENNAMETAL INC., MINING TOOL DIVISION, Bedford, Pennsylvania.

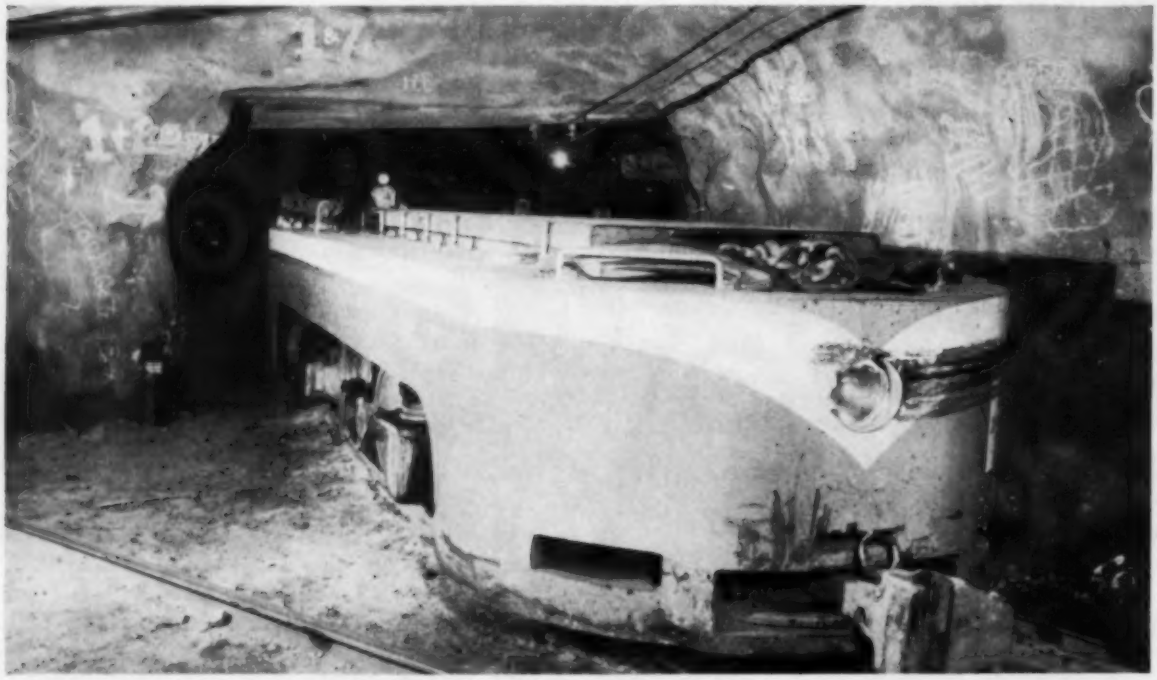
*Trademark

C-5021

Visit Booth 739
AMERICAN MINING CONGRESS CONVENTION
CLEVELAND, OHIO
MAY 13 to 16
See these Kennametal Taper Shank Bits—they will be on exhibit

INDUSTRY AND KENNAMETAL
. . . Partners in Progress

FOREMEN'S FORUM



HAULAGE CAN BE SAFER when good equipment that is properly maintained is operated by trained haulage crews. The responsibility for improving haulage safety must be shared by top management, workmen and supervisors.

Improving Haulage Safety

82 men in bituminous and six men in anthracite lost their lives at deep mines as a result of haulage accidents. Here is a review of how the accidents occurred and what can be done to prevent them.

THE EMPHASIS ON ROOF SAFETY is valid and necessary, since year after year this accident cause catches unaware more men than any other hazard. But there is a No. 2 Killer—in the haulage accidents that pick off victims in the same sneaky manner as roof falls. In 1956, 82 men lost their lives in haulage accidents at bituminous mines, 71 underground and 11 on the surface at deep mines. In anthracite, in 1956, six men were killed in haulage accidents.

An analysis of the 82 fatalities in bituminous mines, in a recent USBM Health and Safety Study, leads to the conclusion that definite progress in haulage safety can be made if haulage employees, supervisors and management take energetic steps to keep the physical system in good condition and to overcome the human failings that directly contribute to a number of haulage fatalities.

A shocking revelation in the study is that 36 of the 82 fatalities were determined to have occurred in definite violation of the Federal Mine Safety Code. Furthermore, it was determined that in 54% of the fatals some form of physical or operating hazard was the primary cause, and in 40% of the fatals the primary causes were unsafe practices, including involuntary or deliberate chance-taking.

Physical hazards, which foreman should strive to eliminate, include the following:

1. Insufficient overhead clearance.
2. Defective or poorly-maintained equipment.
3. Steep grades without adequate blocking devices or derails.
4. Irregular roof and rib brows.
5. Accumulation of coal on tracks.

Unsafe practices, which can be eliminated through joint action of workmen and supervisors, include:

1. Failure to clear right-of-way with dispatcher.
2. Coupling or uncoupling cars in motion.
3. Riding in a hazardous place.
4. Failure to adequately block standing cars.
5. Getting on or off moving equipment.
6. Failure to get into a safe place while trips are passing.
7. Shuttle-car operators not facing the direction of travel.
8. Several human failures, such as failure to re-align switches, failure to re-

To withstand this kind of punishment...

Allegheny River Mining Company chose Rome's extra-tough shuttle car cable

No Damaging Bend—Just a *Flip-over.* When flexed in use, Rome's duplex flops over and bends on its minor axis. Its interlocked construction forces the change and causes a flip-over, *not* a breakdown. This means that obstructions on the floor of your mine can't put damaging wrong-way bends in this tough cable.

To avoid cable breakdown under severe operating conditions—such as might be encountered in the expedient temporary tie illustrated above—the Allegheny River Mining Company relies on Rome 60 parallel duplex cable.

Here's a cable you can scrape, twist, soak, crush, or bend—Rome's shuttle car cable is built to withstand tough mine hazards.

New integrated design

A rugged Neoprene jacket and the braided conductors are *meshed* together, providing built-in protection against conductor slipping. Greater flexibility arises from an increased number of strands in the ground conductor and power conductors. And a closely woven fibrous covering on the ground conductor minimizes the mechanical working of individual strands.

The sheath, web, power conductors, and ground make up one integrated unit. No matter how you twist or flex this rugged cable, the sheath won't separate from the conductors.

Free sample

Put a two-foot sample length of Rome's shuttle car cable to your toughest test. Ask your nearest Rome Cable representative for your free sample—or write to Department 508, Rome Cable Corporation, Rome, New York.

Visit us in Booth 1504 at the AMC Coal Show in Cleveland, May 13-16

ROME CABLE

CORPORATION

move cable nips, failure to align couplings, and so on.

Each of the foregoing was a contributing factor in one or more haulage fatalities in 1956. Shortcomings like these at bituminous mines claimed the lives of 20 motormen, 24 brakemen, 12 shuttle-car operators, one driver, four car droppers and 21 men not normally employed in haulage work. Here is how some of the fatal accidents occurred.

HOW FATAL HAULAGE ACCIDENTS HAPPEN

• Sixteen men were killed as a result of riding in hazardous positions, standing up to operate the equipment, jumping on or off moving locomotives or cars, coupling cars in motion, and mechanical failure of locomotives which caused men to jump or fall into the path of moving equipment.

• Crushing of men between low roof or crossbars and moving equipment was the direct cause of 14 deaths. Some unsafe acts performed by the victims were riding in unsafe places, raising up under low roof to replace trolly pole, boarding moving locomotives and coupling cars while riding a moving trip.

• Collisions killed seven men. Contributing factors were failure to block cars, uncoupling a trip before the pusher locomotive made contact with the trip, riding the front bumper of cars being pushed, failure to come to a complete stop in approaching a main-line intersection and neglecting to obtain right-of-way from the dispatcher.

• A brakeman was killed in trying to leave a runaway trip. He bumped into a post and bounced back against the trip. The runaway resulted from a broken coupling pin and failure to provide enough skids under the cars.

• Derailments killed five men, four as the immediate results of the derailments and one while trying to rerail in an unsafe manner. Poor track caused two of the derailments.

• A motorman had his head pinned between a car and an overhanging coal rib. There was insufficient clearance.

• Eight shuttle-car operators were squeezed between the car and coal rib or post. Five were regular operators, one was a substitute operator, one was a utility man and the other was a face boss. Two of the fatals were attributed to inexperienced operators, in one the operator's foot slipped from the brake pedal onto the starting button, two were killed for failing to face the direction of travel, one was operating the car while standing, one was attempting to get back on a runaway shuttle car and one died because he operated a car without brakes.

• Three shuttle-car operators died as a direct result of lack of overhead clearance, and one was struck in the face by a rope hook while removing the car-hoist rope from a trip.

• Non-haulage employees were victims too. A runaway trip struck a standing trip, killing a track cleaner who was crossing between two of the cars in the standing trip. Inadequate blocking of a trip and failure to open a derail permitted a trip to enter a room and crush a coal loader against the face.

• Three men were killed from failure to get in a safe place while trips passed. Five were killed in falling off or being knocked off locomotives, and at least three of these victims should not have been on the locomotives.

• So the record goes. In case after case, the fatality resulted from physical hazards or unsafe practices or a combination of both, the Health and Safety study says.

IMPROVING HAULAGE SAFETY

The study concludes with lists of recommendations on improving haulage safety addressed to management and employees. Supervisors should be go-betweens in getting the information to their crews.

Employees should heed the following suggestions:

1. Study the job; analyze and plan operations for maximum safety.
2. Study the equipment; learn its performance, limitations and safe operating conditions.
3. Check equipment for defects and malfunctions before starting work.
4. Study potential hazards (how they occur and when they occur) and corrective measures.
5. Comply with instructions to best of ability.
6. Consult foreman when unfamiliar with proper procedures.
7. Report all hazards and deficiencies to officials.
8. Cooperate with company safety policy at all times.
9. Be sure that all signals are understood before acting.
10. Always keep equipment under control.
11. When operating equipment, consider the potential hazards to other workers.
12. Develop safety consciousness for personal safety as well as the safety of others.

Suggestions for management include the following:

1. Select transportation employees on the basis of physical ability, mental qualifications and emotional stability.
2. Establish some form of job safety training and certification for transportation employees. Train relief employees frequently to insure their competence and give them practice in operating equipment.
3. Promote reasonable safety rules to govern the actions of haulage employees.
4. Conduct regular meetings of officials and haulage employees.
5. Plan the haulage system on the basis of present and projected requirements.
6. Establish a preventive maintenance program, whereby defective haulage equipment is taken out of service before it breaks down.
7. Improve the supervision of haulage employees.
8. Provide the necessary accessories for safe operation, such as skids or retarding devices, rerailers, lifting jacks, fire extinguishers and other equipment.
9. Establish a positive communications or dispatching system with safety auxiliaries, such as automatic traffic-control blocks, signals and switches.
10. Provide safety-designed equipment that affords workers a comfortable, safe place to ride.
11. Set up standards on the basis of engineering and safety knowledge to govern the layout, installation and maintenance of haulageways, shafts and slopes, with emphasis on the following:

(a) Track standards—alignment, gradient, size of rails, ballasting, drainage and maintenance.

(b) Haulage roads—vertical clearance over equipment, side clearance, shelter holes, trolly wire, electrical installations, illumination and timbering.

The Health and Safety Study (HHS No. 453) from which this information is abstracted was prepared by George M. Smith, safety representative, under the direction of H. F. Weaver, chief, Coal-Mine Inspection Branch, and James Westfield, assistant director, USBM.

The heart of the matter is that haulage safety demands a positive approach, especially by underground supervisors. Management may provide the best possible physical plant and workmen may have the best of intentions, but close supervision is required to get maximum haulage-safety benefits out of the plant and the intentions.

Giving Direction to Employees

Some DO'S and DON'TS in giving orders that will help you get better response and better work.

By ERNEST W. FAIR, Boulder, Colo.

THE COAL-COMPANY OFFICIAL who has given some thought to his manner of giving instructions or suggestions to employees is usually the one who secures maximum results from his department. He has learned early that there are definite "do's" and "don'ts" to be

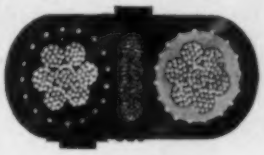
(*Continued on p 136*)

Parallel Duplex (Flat Twin) Mining Machine Cable—600 Volts
(Ungrounded or grounded)

Single-Conductor Locomotive Gathering Cable—600 Volts

Portable Power Cables—Two, Three and Four Conductors
(Ungrounded up to 3,000 Volts, or grounded up to 5,000 Volts)

Three-Conductor Mine Power Feeder Cable
(Shielded with ground wires up to 10,000 Volts)



Rome's shuttle car cable can't be damaged by bending

The rugged Neoprene jacket forms a resilient web between insulated power conductors and ground conductor for maximum impact resistance. The open braid on each conductor firmly interlocks conductors to the sheath as a sturdy integral unit. A greater number of finer strands in power and ground conductors—plus a closely woven fibrous covering around the ground conductor (to minimize mechanical working of the fine strands)—increase over-all flexibility. These two features, together, prevent the damage that constant flexing, twisting, and tension might otherwise cause.

Vulcanized in lead for extra toughness

Rome 60 mining cables are built for rugged duty, both above and below ground

These tough Rome cables have a much longer service life than ordinary cables. This is of dollars-and-cents importance to you because it can mean less down time, reduced replacement expenses, and increased production.

Here are some of the construction features that make Rome 60 cables your best mining cable buy:

Conductors. All conductors are of finely stranded copper wires for maximum flexibility.

Insulation. A long-aging, heat- and moisture-resistant rubber compound permits operation at 75° C., thereby providing overload protection. For high-voltage service, an ozone-resistant insulation is used.

Reinforcements. On Rome 60 portable cables, a heavy reinforcing open braid locks the Neoprene jacket to the inner construction to prevent failure from twisting, pulling, flexing and sheath separation.

Jacket. Neoprene vulcanized in a continuous lead mold provides durability and high resistance to abrasion, acids, oils and flame. All Rome 60 mine-trailing cables are surface-molded "P-105 BM" indicating full compliance with Federal and State of Penn. safety codes.

Specify Rome 60 mining cables for your next job. Contact your nearest Rome Cable representative for more information—or write to Department 176, Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

observed, including the following nine:

Treat each as an individual.—This is a top recommendation of each of the officials. They point out that we cannot assume all employees are alike in their reactions to suggestions from the boss. Each man has his own peculiarities. This calls for a careful study of each employee so that specific suggestions may be directed to points touching on his individual traits. It takes only a moment or two and it pays off in assurances of positive reaction from the individual when a suggestion is made.

Avoid military commands.—There was a day when the accepted method of passing suggestions to employees was in the manner of a top sergeant issuing orders to a rookie. That day is gone forever. The supervisor who still employs the military command system is usually the one with the least responsive workers. Today's procedures call for diplomatic treatment in every relationship between coal-company supervisors and the people who work for them. Presenting every suggestion in the same vein is required procedure if we wish to achieve maximum results.

Outline it to yourself first.—Here is the suggestion, we are told, that is most difficult for the new supervisor to learn. Many oldtimers still have not acquired a thorough understanding of its importance. We can hardly expect maximum results from suggestions we give unless each is well thought out and carefully detailed. Doing so is our assurance that we have not overlooked any important detail, that the suggestion is being presented clearly and concisely and in such a manner that the possibility of misunderstanding by the employee is reduced to an absolute minimum.

Be positive, not negative.—This is an important point that is continuously emphasized by not only every executive with whom the subject is discussed but but by all the experts in employee management. All stress the "do" approach, rather than the "don't". It is always easier for an employee to go into immediate action on a suggestion when he is given the specific and detailed steps he is to take and does not have to cope with the "don'ts" involved in the job to be done.

The positive suggestion is not only always easier for an employee to follow but direct action to implement it can be taken quicker and with surer results. In those cases where it is imperative that the suggestion be put into action immediately, and without error, positive presentation is an assurance that such results will be obtained.

Key each suggestion to employee reactions.—After any employee has been with a supervisor for a few weeks that individual's thinking processes should be fairly clear to the supervisor. It is important that they be understood. It is also important that he carefully study each employee's fixed reactions to suggestions from above. When the executive has acquired this knowledge he is then in a position to carefully key each of his suggestions to that individual's personality. This not only makes certain that we have recognized the top qualities of that employee but that we are putting them to maximum use.

Be sure to provide background.—Here is another big point mentioned by coal-company officials. They emphasize that one must always be certain the employee is given all the necessary background to properly carry out each and every order that is given him. One of the great resentments among employees is being told to do something without having any information or detail on how the assignment is to be handled. Executives, we are told, too often assume that every employee already possesses such background information and that it is a waste of time to go over the ground again.

Such is not always the case, particularly when the suggestion or idea embraces some new procedure or plan that has not as yet been used in the company's way of doing things. Even when the suggestion involves old procedures, such details may have been forgotten by the employee or he will have to waste precious time in organizing them in order to carry out his assignment.

Make clear the reward that is to follow.—This does not mean that we should hold out a reward to every employee for carrying out the orders or suggestions given to him.

The meaning the successful officials see in this is that the employee should be made acquainted with the results that will follow by his carrying out the suggestion. When we can see worthwhile results from the things we are about to undertake we always enter into those tasks with a great deal more enthusiasm and interest than we do when no such goals or rewards can be seen for the extra effort we will have to expend in doing the assigned job.

Be sure he understands the "reasons why."—One of the prerequisites of the supervisory mind is to know exactly why every move is made. We too often assume that the employee has the same qualities. The latter is true only in the most unusual cases.

In very few instances are employees required to reason out the factors involved in the things they do on their jobs. The mere fact that this is seldom required tends to dull the employee's use of this valuable facility. We cannot expect the man to automatically reason out all the implications of every suggestion given to him.

It takes little extra time or words for the supervisor to add brief explanations of the reasons behind the suggestions he presents to his men. Doing so not only insures better reception of the idea by the employees but also adds to their ability to carry out such suggestions satisfactorily. We all tend to do things better when we understand why the assignment has been given us.

If it's a correction, do that privately.—When the suggestion involves correction or reprimand it is always good supervisory diplomacy to take up the matter privately with the individual. Even in cases where the matter is a minor one, best employee reaction can be assured when this procedure is followed, for no one likes to be corrected in front of others.

Each of the foregoing have been of positive help to a number of coal-company officials. They can be applied with equal success by others.

Is Our Face Red!

WE CERTAINLY BOOTED the quiz in *Foremen's Forum* in the March issue. Don H. Townsend, Kemmerer Coal Co., Frontier, Wyo., clobbered us with a list of five of our published answers which he vows are wrong. We shall concede three (pleading extenuating circumstances in one of these), but we shall defend the other two. Here's the blow-by-blow account:

Problem No. 4—Don says the answer should be 616.7 gpm, and he's right as rain. Score one for Mr. Townsend.

Problem No. 7—The answer should be 17.9 miles. (We plead the hazards of publishing. Our original copy to the printer shows 17.9 instead of 18.3, but since we didn't catch the boner, score two for Don.)

Problem No. 10—We still think $1,599.-05 is right (Don says $1,599.11). The hitch here may be in figuring the cost of the work gloves. We say, 3.33 doz (40 pr) times $15.95 per doz amounts to $53.11. Score one for Knucklehead, the *Coal Age* Quizmaster.

Problem No. 17—What we thought was a curve ball turned out to be a boomerang. We thought this one could be worked by disregarding the trucks and concentrating on the shovel cycle. In fact, we thought we had it rigged that way. Don Townsend says, "Better you should buy more trucks"—and that really is the best answer. He figures 96 tons could be moved by actually calculating the turnaround time of the trucks. Score three for Don.

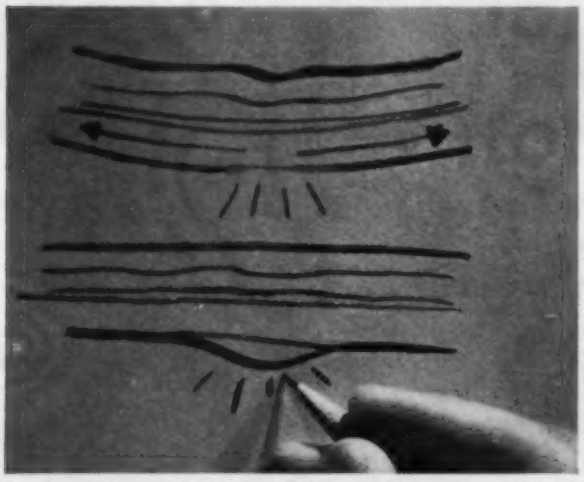
Problem No. 18—We think we are right on this one, using 90 lb per yd, not per ft. Score two for KN, the *CA* Quizmaster.

Whew!

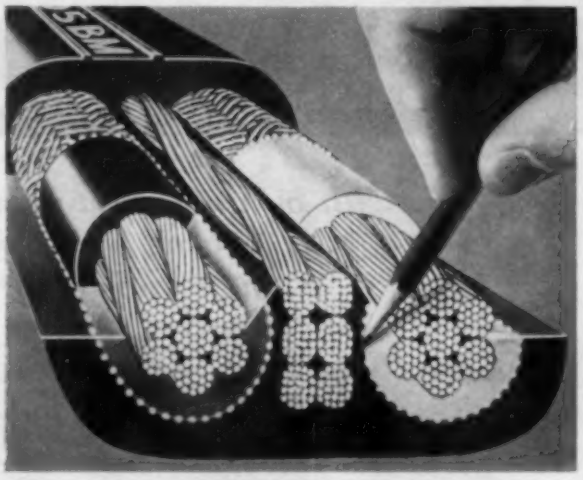
Rome's shuttle car cable can't be bent the wrong way!

JUST *TRY* TO BEND IT THE WRONG WAY. Force a length of Rome 60 Parallel Duplex to bend along its major axis—*if you can!* You'll discover that you can't put a damaging wrong-way bend in this tough cable—and neither can obstructions on the floor of your mine.

NO DAMAGING BEND—JUST A *FLIP-OVER.* When flexed in use, Rome's Duplex flops over and bends on its minor axis. Its interlocked construction forces the change and causes a flip-over, not a breakdown. This means that the power keeps coming through, and your coal production remains high.



WHAT HAPPENS TO *OTHER* CABLES. Wrong-way bends on ordinary shuttle car cables often cause conductors to slip, causing distortion. One side of the cable may stretch, the other crimp. Result: *a weak spot.* Further flexing, tension, or twisting turns the weak spot into a breakdown. Coal production then falls behind.



WHY ROME'S DUPLEX BENDS THE RIGHT WAY. Open braid around each insulated conductor forms a crisscross tread-like surface—one that won't slip. The tough Neoprene jacket and braided conductors, meshed together, bend just one way. The interlocked construction assures the right bend, and power keeps coming through.

Visit us in Booth 1504 at the AMC Coal Show in Cleveland, May 13-16

Send for your FREE sample! Put a two-foot sample length through this same test yourself. See how Rome 60 Parallel Duplex simply can't be bent the wrong way. Ask your nearest Rome Cable representative for your free sample—or write to Department 502-B, Rome Cable Corporation, Rome, New York.

ROME CABLE

CORPORATION

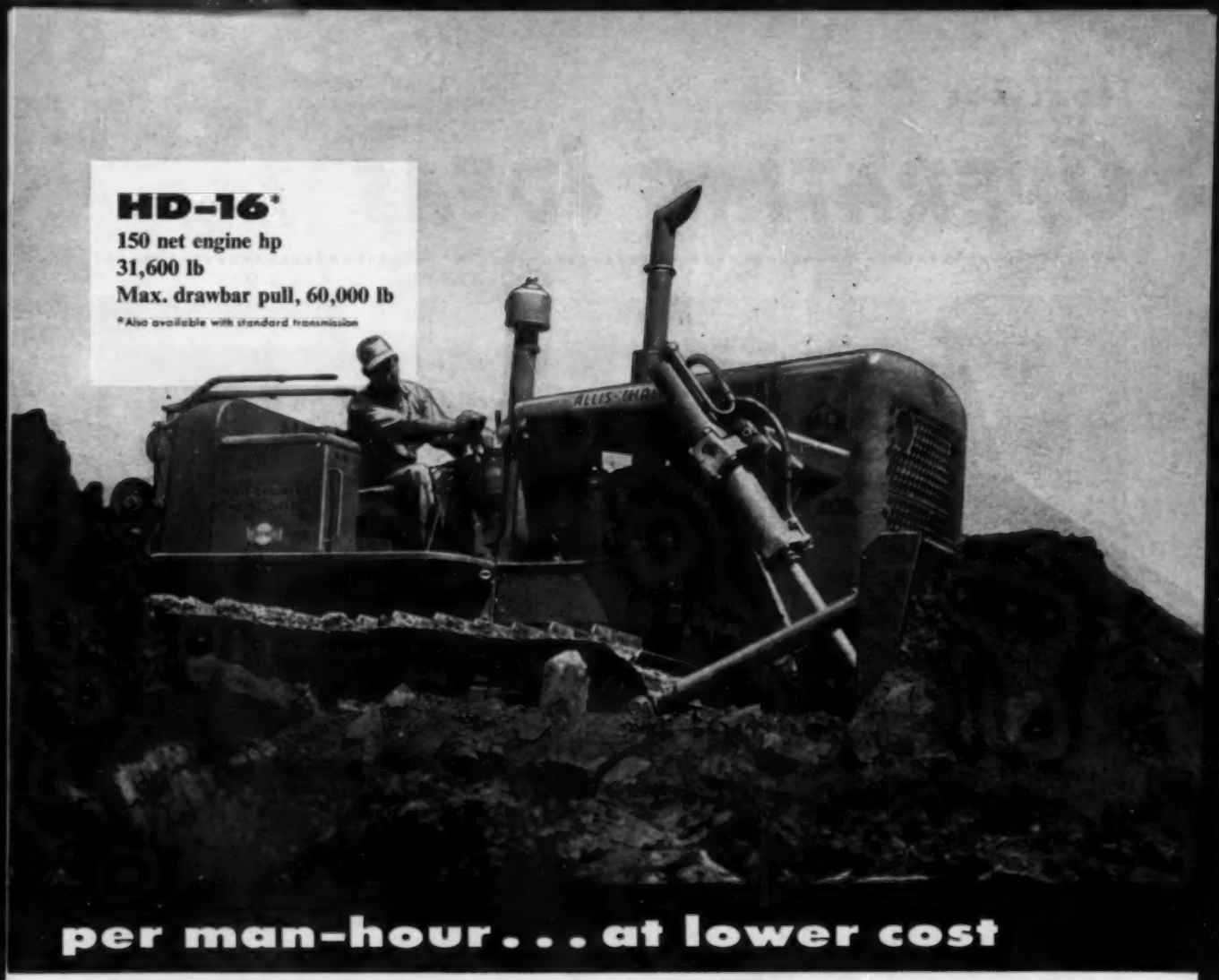
This season do more BIG work

. . . with mining's best-proved torque converter tractors
. . . backed by 17 years of on-the-job experience
. . . thousands of profit-tested production models

More efficient dozing—Matched engine-converter-transmission team lets operator choose speed range for each job as he starts . . . finish most jobs without further clutching or shifting (except for reverse). With full control at throttle, he can work safely and efficiently regardless of terrain.

Faster on tough scraper jobs—These Allis-Chalmers tractors multiply torque up to four and a half times . . . develop maximum drawbar pull when it's needed most . . . start the load smoothly regardless of material in the cut . . . automatically accelerate to the highest speed that conditions permit.

Nothing like 'em on big loading jobs—The 3-yard HD-16G and 4-yard HD-21G tractor shovels are tough, mobile, flexible enough to pay big dividends on many projects. Operators can crowd surely and steadily . . . without stalling, shifting gears or losing control of the bucket because of slow engine speeds.



per man-hour . . . at lower cost

No construction equipment dealer in your area knows torque converter tractors as well as your Allis-Chalmers dealer. See him . . . and get the benefits of 17 years' experience working for you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Longer life for big equipment—Hydraulic torque converter cushioning reduces shock and vibration on the power train, the entire tractor and its auxiliary equipment—mounted or drawn. That means less downtime, more production time . . . better profit protection on any job!

ALLIS-CHALMERS

Engineering in Action

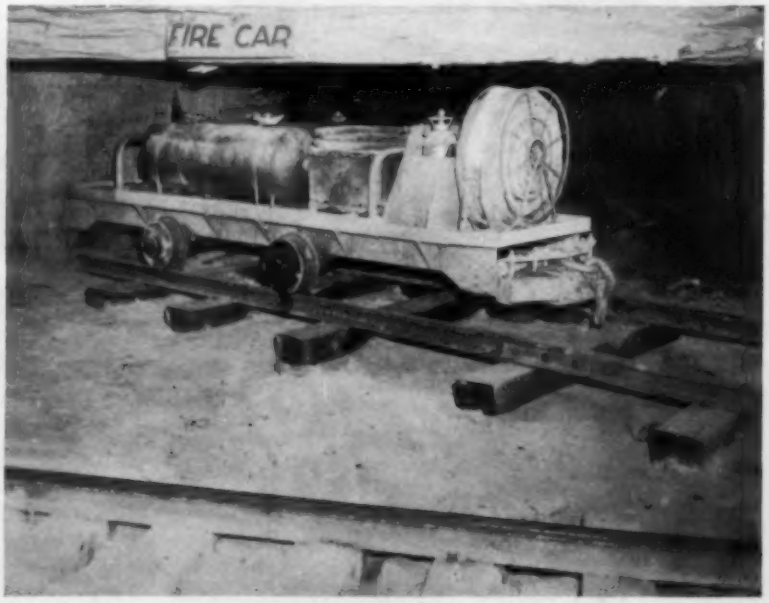
regardless of terrain.

est speed that conditions permit.

of the bucket because of slow engine speeds.

COAL AGE

OPERATING IDEAS



Handy Units Ready for Fire Fighting

THESE handy fire-fighting units are strategically located throughout Alabama By-Products' Maxine mine. The stand for the hose reel and dry chemical extinguisher was made by welding steel cross members to two screw jacks and providing sockets for the reel to rotate in. One of these units is installed at each belt head. The fire car contains fire extinguishers, hose and chemical tanks. It is parked at a central location and can be towed anywhere on the supply track in a short time. Water for fire fighting is available from a special high-pressure line equipped with valves every 200 ft.

Old Tire Prevents Damage to Door

IF THE BOTTOM DOOR of the dipper on your shovel slams against the dipper stick when opening on a high lift, do what the men did at Teramana Bros. Coal Co., Steubenville, Ohio, to solve the problem. Take a worn truck tire, cut it through, wrap it around the dipper stick at the point where the door slams against the stick and lace it in place with wire rope. This simple step will save wear and tear on the door and the stick and prevent possible damage to the dump line.

better profit protection on any job!

US RUBBER CONVEYOR BELTS

Visit our Booth #821 and Entertainment Suite at the American Mining Congress Cleveland, May 13-16

"Getting coal from the mining machine to the main haulageway used to be one of our main problems," says an executive of Old Ben Coal Corporation. "Then we installed an extensible system of conveyor belts. This eliminated the time-consuming job of continually moving the pit car and putting down and pulling up railroad track to keep up with the mining operation."

Long known in the coal industry as a progressive outfit, Old Ben chose U. S. Conveyor Belts because of the good job they were doing in their preparation plants above ground and because of the belts' proven performance on extensible conveyor systems.

These belts have made a hit with Old Ben officials in every way. Output has gone up 10% and the belts are practically maintenance-free.

This extensible conveyor* has idlers suspended from wire ropes. The 36" U. S. Giant® MineHaul Belt (Style EN) in use here, provides just the right amount of flexibility to complement this new extensible conveyor system. The belt's resiliency and troughability keep it perfectly trained all the time.

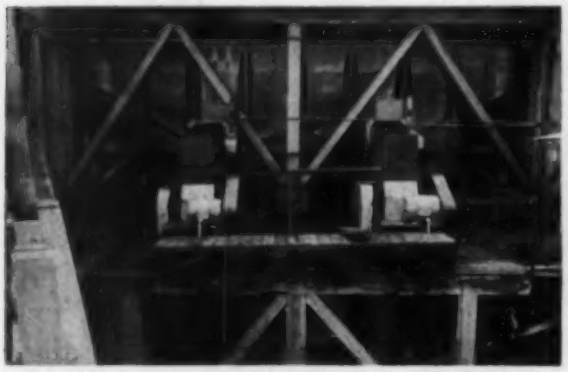
For any materials handling problem, there is a "U.S." belt—plus expert engineering assistance—available at any of the 28 "U.S." District Sales Offices, at selected "U.S." distributors, or write us at Rockefeller Center, New York 20, N. Y.

In Canada, Dominion Rubber Co., Ltd.

*Manufactured and patented by Goodman Mfg. Co.

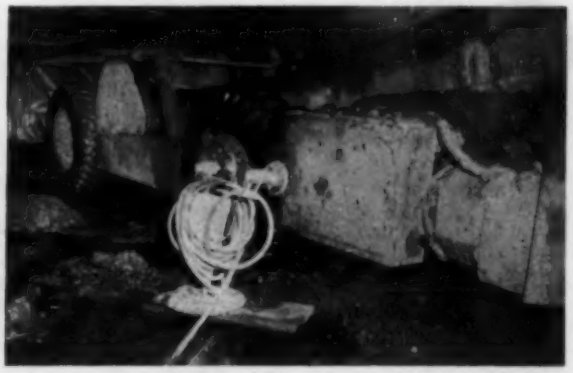
US RUBBER Mechanical Goods Division

United States Rubber



Low-Cost Bin Made From Scrap Railroad Car

AN INEXPENSIVE hopper to receive coal from drop-bottom trucks was made from a scrap railroad car and installed at DeBardeleben Coal's new Waterside mine. The two sets of car wheels were removed and vertical steel members were added at each end to support the hopper on a concrete base. Coal is unloaded from the bin by two Barber Greene car-unloaders placed under the car doors. The company expects to salvage the bin for use at a new site when coal in the present area is exhausted.



Lights Prevent Condensation in Electrical Controls

CONDENSATION of moisture in equipment panelboards over a weekend can cause a lot of maintenance headaches on Monday morning. Maxine mine overcomes this problem by placing two lights near the panel over the idle period. The lights are mounted on a lightweight stand that can be readily carried to the car. Heat from the lights penetrates the control box and keeps it dry. Mine management reports the electrical troubles resulting from moisture in the controls have been virtually eliminated.

Scoop and Chute Permit Easy Belt Sampling

TAKING A SAMPLE from a loaded belt every 20 min at DeBardeleben Coal Corp., Waterside, Ala., is easy with this swinging scoop and chute arrangement. Here is how it is done. Every 20 min the boom operator at the barge-loading site stops the belt to take a sample. He walks from his control tower to the device, pushes the scoop across the belt and pulls it back. The coal pushed by the scoop falls into a chute under which is parked a pickup truck. A total of 1,500 lb is obtained in this manner from the 2,100 tons flowing to a barge. Each increment of the sample is taken in the same manner and is about the same weight. Thus the company gets a representative sample of each barge load.

The scoop handle pivots on a rod secured to the top member of the steel frame. It is guided across the belt between two angle irons spaced closely together and installed 90 deg to the direction of coal flow.

Spring Maintenance Tips for Cooling Systems

HOT WEATHER will soon be here and with it will come the danger of overheated engines in shovels, trucks, tractors and other equipment. Servicing the cooling system of engines in these units for hot weather is just as important as servicing them to withstand the wintry blasts. Unless all winter-worn antifreezes, including "permanent" types, are drained, the result may be overheated engines or more serious damage.

All so-called "permanent" antifreezes can turn acid after a season's use, according to cooling system experts of the du Pont Co. Air and exhaust gases seeping into the cooling system oxidize the glycol, forming harmful acids. As these acids form, they are neutralized by rust inhibitors. In time, however, the inhibitors become depleted, leaving the solution dangerously corrosive. This corrosive solution eats into the vital parts of the cooling system, producing rust, which clogs the radiator and narrow passages in the engine block. As a result the engine overheats and more serious trouble may be caused, such as, scored cylinders, warped cylinder head and burned or sticky valves. Any of these can be expensive to repair.

Adding a fresh supply of rust inhibitor to the winter-worn solution will not solve the corrosion problem. At best this only slows the corrosive action. It cannot eliminate the damaging acid salts already formed.

For safe, trouble-free operations, the National Bureau of Standards, automotive authorities and antifreeze manufacturers recommend the following program before hot weather sets in:

1. Drain and discard winter-worn antifreeze solutions from the radiator and block.
2. Clean and flush the cooling system, using a chemical cleaner, if necessary.
3. Check all parts of the cooling system for leaks or wear; replace or repair where necessary.
4. Refill radiator with fresh water and add a chemical rust inhibitor.

34,000 TONS OF MOLYBDENUM ORE are hauled each day from Climax Molybdenum Company's mine at Climax, Colorado. Seven of these 20-ton General Electric swivel truck locomotives help maintain this record haulage.

11,000 TONS OF ORE DAILY with three 40-ton G-E locomotives in operation at The Consolidated Mining & Smelting Co. of Canada Ltd.'s Kimberly, B.C. lead zinc mine.

PLANNING FOR INCREASED PAY LOADS resulted in the purchase of six 8-ton G-E locomotives by Jones & Laughlin Steel Corp. for their Negaunee, Mich. Tracy Mine.

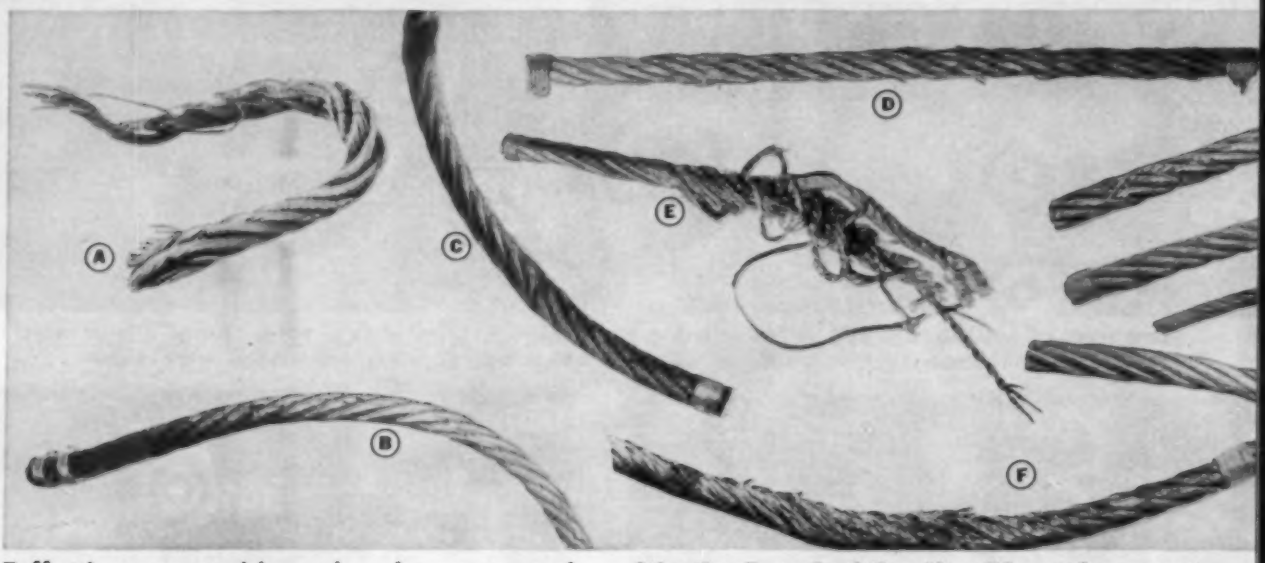
3 Mines Boost Haulage Output with Efficient, Dependable General Electric Locomotives

Whatever your mine haulage or gathering operations may be, there's a General Electric mine locomotive that's right for the job. In an increasing number of mines, as in the case of the three pictured above, G-E locomotives are proving that haulage output and efficiency can be significantly increased with the correct motive power applied to a particular haulage need. For more information, or for a free survey of your haulage needs at no obligation to you, contact your General Electric Apparatus Sales Office. General Electric Company, Locomotive and Car Equipment Dept., Erie, Pa. 120-95

Progress Is Our Most Important Product

GENERAL ELECTRIC

Tuffy Wire Rope Tips



Tuffy gives you a quick run-down here on some of the mortal enemies of wire rope — the abuses that quickly ruin rope efficiency or end its life abruptly long before you have had the service you paid for.

Even the best wire rope is a sitting duck for the enemies which won against the wire rope pictured on these pages. When you avoid or eliminate them you make important gains in longer rope life, better service and greater economy. Remember, your Tuffy distributor will be glad to work with you against these and other wire rope hazards.

It's the "end of the line" for wire rope when these things happen:

A. Mangled in a wedge socket. Here's the result of improper socketing. This fatal rope injury was caused by a poorly designed or worn out wedge socket. Failure at the dead end can damage other sections of the rope.

B. Rusty road to ruin. Rust — No. 1 enemy of steel — takes a heavy toll in wire rope life. It's an insidious, silent type of killer, often doing irreparable damage before it's even noticed. The one-strand break shown above resulted when the rope was allowed to become rust-bound through lack of lubrication. With other conditions ideal, tests show properly lubricated rope has up to 10 times the life expectancy of dry rope.

C. The crushing blow. The Sunday punch for this piece of wire rope was delivered by a tractor cleat — just one of many crushing injuries that result when wire rope is run over or banged into by a hard, sharp object. Even the best rope is no match for this kind of mistreatment.

D. Strangled by misfit sheaves. When the bearing surface of a

Tuffy Special Wire Ropes are tailored to special use. Ordering is easy:

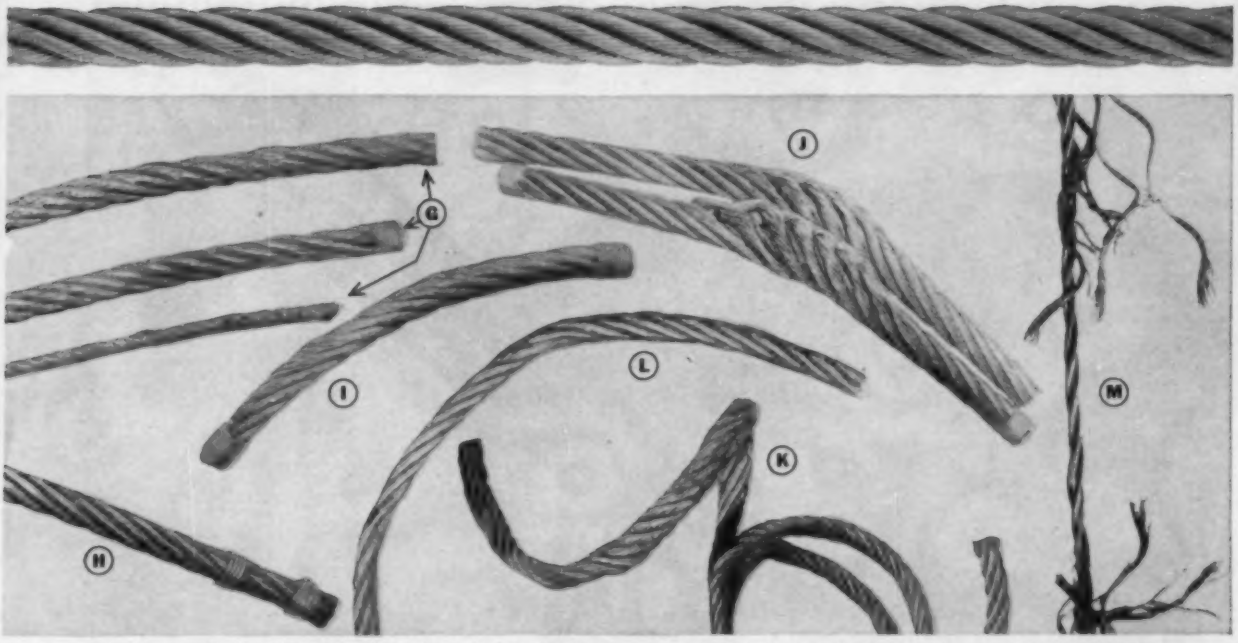
Tuffy Scraper Rope

Moves more yardage per foot because **Tuffy** Scraper Rope is specially built to take the beating of extreme drum-crushing abuse. Flexible; withstands sharp bending; hugs sheave grooves and winds snugly and smoothly on drums. High resistance to load shock on slack line.

Tuffy Dragline Rope

A longer-wearing line for all dragline operations. Special abrasion resisting construction which also gives extra flexibility. Tuffy Draglines also spool better, ride better on grooves and hold tightly to drums when casting. Consistently dependable in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

How wire rope is crippled and killed without a fighting chance



sheave is too small for the rope diameter, pinching action quickly destroys the rope especially when it is overloaded. The one shown above was knocked out in just 1½ hours of service.

E. Apparent suicide! This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually it was a case of sudden slack which threw the rope out of the sheave.

F. This rope came to an untimely end by operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope.

G. Victim of "the bends." Excessive bending soon wears out rope. Generally, more flexible ropes are used as bending stresses increase (with decrease in tread diameter of sheave or drum). If a rope is operated on a sheave too small for its bending characteristics, early failure is certain. Through an exhaustive series of bending tests, Union engineers have compiled data that you can use to be sure you get the rope construction that will give you the longest service life. Ask about it.

H. On the "blink" from a kink. This open kink resulted from mishandling of wire rope. Guard against kinks by proper winding on the drum. Never pull a loop smaller; always enlarge it, then straighten out the rope.

Crushed and worn from "beatings on the drum." Drum wear gives wire rope severe punishment even under normal operating conditions. This wear is found at the cross-over points and at the flange. Excessive drum crushing results from operating on too large or too small a drum. Here are typical "drum beatings":

I. Cross-over wear

J. Cross-over crushing on drum

K. Drum-crushing on oversized drum

L. Drum-crushing on undersized drum

Although drum wear cannot be eliminated, its effects can be greatly reduced. Under properly engineered procedures, two and three times the service can be obtained from the same line. Union Wire Rope engineers will help you with this problem. Get in touch with us for more information.

M. Overloaded — soon exploded. Wire rope is "prescribed" for a given use on the basis of breaking strength plus a safety factor of 4. The grade of steel, type of construction and size of the rope determine tensile strength. It must be properly related to the loads it will carry, or expensive and dangerous early failures are likely to occur.

Just say **Tuffy** give length and size, and forget complicated specifications.

Tuffy Slings and Hoist Lines

Here's a team that cuts hoisting and down time costs in all types of materials handling.

Tuffy Slings are made of a patented, 9-part machine-braided fabric that stays extra flexible, and isn't materially damaged by knotting or kinking.

Tuffy Hoist Line is a special construction with the extra flexibility and toughness for longer service life on overhead cranes, derricks and clamshells.

Tuffy Dozer Rope

Long after ordinary ropes are worn out, **Tuffy** Dozer Rope has the stamina it takes to keep on handling the blade. 150' reels mounted on your dozers let you cut off worn sections without wasting good rope. This unbeatable combination piles up sizeable savings on dozer rope costs.

Your Tuffy distributor will help check your equipment

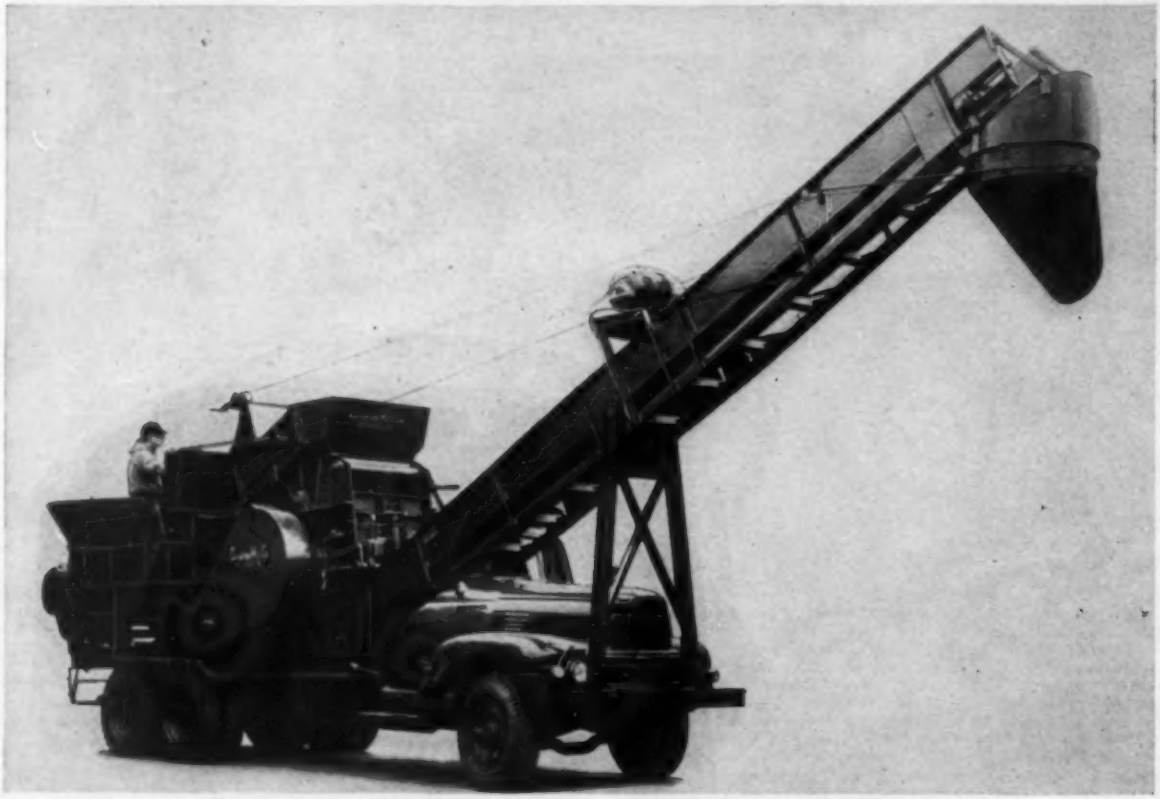
Condition of equipment is a big factor in longer rope life and greater economy. Your Tuffy distributor will help you check equipment and operating conditions to make sure everything is in your favor for getting the greatest service out of your Union wire rope. Ask him to lend a hand in a thorough inspection. He'll be glad to do it. And if there are still knotty problems, Union Wire Rope Corporation engineering department will help further.

union Wire Rope **corp.**

2130 Manchester Avenue, Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

EQUIPMENT NEWS

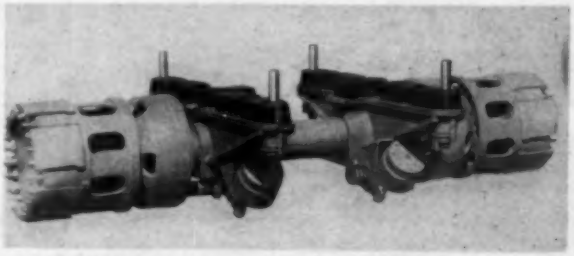


Mobile Crushing Plant's Capacity Rated At 125 tph

Champion Mfg. Co., 1808 W. Carson St., Pittsburgh 19, Pa., has announced the production of a mobile crushing plant designed to accept open-pit feed and deliver crushed coal as small as ¾ in. The plant's capacity is 125 tph, according to Champion, which says that the unit will save from 75c to $1.25 per ton in strip operations. The crushing plant's components are a hopper for receiving coal; a variable-speed feeder for delivery to a picking table; a McLanahan Black Diamond triple-roll crusher; and a conveyor equipped with a swivel chute for delivering crushed coal to trucks. The entire plant is mounted on a modified flat bed truck. The main feature of the crushing plant is its triple roll crusher, which makes reduction from open pit feed to sizes from ¾ in to 6 in in a single pass with a minimum of fines. The triple roll crusher is equipped with an 18-in diameter toothed roll to crush primary feed against a curved crushing plate. Two 18-in diameter rolls perform secondary reduction. Champion says the crushing plant is designed to operate on top of coal ahead of a shovel. Coal is shovel-loaded into the unit's hopper, then the finished product is delivered to trucks by the swivel-type chute, a device that permits rapid loading in truck after truck. Champion declares the crusher will result in these advantages: 1) elimination of tipple and tipple charges; 2) immediate movement of coal; 3) economical removal of small coal blocks.

Single, Tandem-Axle Suspensions

Hendrickson Mfg. Co., Lyons, Ill., announces the application of its 80,000-lb Model RS single axle suspension to an 80-ton, 60-cu yd coal trailer. The company, which is a manufacturer of single- and tandem-axle suspensions, replaces steel leaf springs with rubber to achieve a cushioned ride during a vehicle's entire performance, i. e. from empty to a full load. The suspensions are designed with automatic cushioning and alignment by means of four drive pins encased in rubber bushings. The pins move vertically in direct relation to the movement of the load cushion. The advantages of Hendrickson suspensions, as pointed out by the company, are an easier ride, shock absorbing qualities, and load equalization. The company



makes single and tandem axle suspensions for vehicles with capacities from 22,000 lb to 150,000 lb.

IN 3 MINUTES THE CP ROOF BOLTING UNIT...

1

• trams into a seam under its own power

2

• sets expansion bolt without repositioning

3

• drills hole at 4 feet per minute

VISIT BOOTH 1713
AT THE COAL SHOW

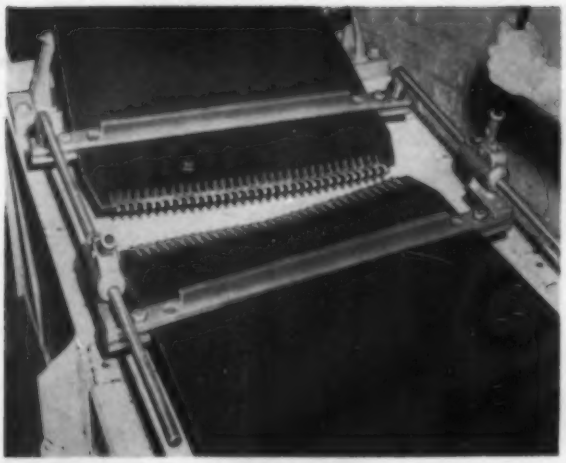
These EXTRAS are available:

- Special low-speed spindle attachment for slow-speed drilling
- Low-seam drilling attachment for low-coal

Only 28 inches high, the self-propelled RBD-30-S is ideal for use in low coal, takes high seams in its stride – even drills slate, shale and laminated limestone without delays. A power take-off from auger and bolt-setter motor powers a totally enclosed drive gear. Tramming control is within easy reach between guide arm handles. Telescopic chuck has a 6-inch auger adjustment to conform to roof irregularities. Built-in slip clutches prevent stalling . . . wheel locks prevent unit from shifting position.

Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

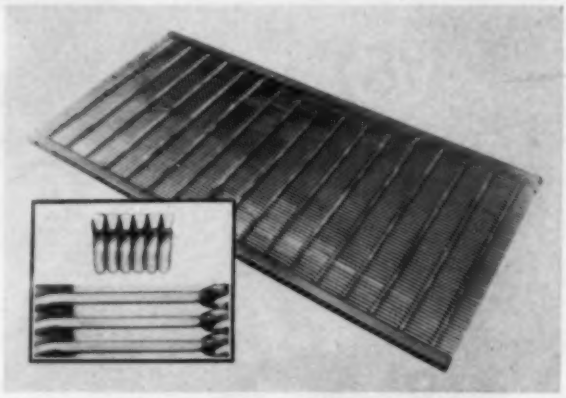
PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



Conveyor Belt Installation

A fast, easy way of installing conveyor belts, considered by the Flexible Steel Lacing Co. as revolutionary, is said to make former installation methods obsolete. The method involves using equipment known as "Far-Pul," which consists mainly of fast-acting jacks. The jacks are used during installation instead of the usual take-up screws. Installation with "Far-Pul" begins by clamping each end of a belt between bars, one set of which is equipped with the jacks and tensioning rods (see photo). The tensioning rods are slipped over studs on the opposite bar clamp. Then the ends of the belt are drawn together by the jacks. When the fasteners have meshed, a pin is inserted through the lacing loops or fasteners. After jack tension is released, the clamps are removed. Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill.

is air and gravity actuated, automatically releases loads when the trailer has been positioned for unloading. Air power closes the release gates for traveling. A bridge-type design, instead of a conventional frame type, directs load weight toward the sides of the trailer.



Screen Designed for Abrasive Use

The new F217 and F250 Kleenslot Wedge Wire preparation screen is for dewatering, screening washing, extracting, filtering and sizing. Manufactured by the Wedge-Wire Corp., Wellington, Ohio, the screen is designed for abrasive applications. Both screens can be interchanged with other types of Kleenslot screens with no mechanical change. They can be furnished in guard bars and special shapes and designs, the manufacturer reports. Construction materials also are varied, ranging from steels, to copper, to aluminum, and then to alloys of the three metals. The F250 screen is equipped with a wire .375 in high and .191 in wide with a standard opening of .060 to .240 in. The F217 has a wire .312 in high and .187 in wide with a standard opening of .040 to .200 in.

Saw Bit Cuts Costs, Speeds Coring

Hoffman Bros. Drilling Co., Punxsutawney, Pa., is manufacturing a tungsten carbide insert saw tooth bit which, the company says, will permit considerable reduction in initial investment plus greatly increased footage speeds. The bit, says, Hoffman, operates as a saw, yet can be attached to a conventional drilling rig. The cores brought up are said to be extremely smooth. Hoffman has tested the saw tooth bit in coarse grained sandstone, shale slate, and limestones.

Single Lever Controls 2-yd Loader

The TL-20D Tracto-Loader is reportedly a completely new four-wheel drive, 2-cu-yd, front end loader. It is manufactured by Tractomotive Corp., Deerfield, Ill., which has equipped the loader with a one-lever power shift and direction control. This permits an operator to shift from any forward

50-yd Trailer Has Bridge Type Design

Timpte Bros., Inc., E. 40th and York Sts., Denver 5, Colo., is the manufacturer of a 50 yd/dump trailer for off-the-road transporting. Truck and trailer are approximately 50 ft long, 9 ft wide, and 11 ft high. A gate-operating mechanism, which

B.F.Goodrich

Universal tires still going strong after nine years' service at Illinois mine

MORGAN MINES, INC., operates 14 units at its Williamson County, Illinois, strip mine. Trucks operate year 'round, hauling 30-ton loads of coal over rock and gravel roads. When this mine opened in 1947, Morgan chose B. F. Goodrich tires—and, writes Superintendent Glenn Peugh, "Some of those original tires are still in service with only one retread! The Universal tread pulls better and gives us far less sideslip and skidding."

B. F. Goodrich builds Universal tires with husky, wedge-shaped cleats that grip the ground for positive traction in forward or reverse. Under the specially compounded tread is the B. F. Goodrich *all-nylon* cord body. Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. The B.F.Goodrich *all-nylon* cord body outwears even the extra-thick Universal tread, *can still be retreaded over and over.*

Why not follow the lead of Morgan Mines and other leading operators all over the country who have switched to B.F.Goodrich tires. Your nearby B.F.Goodrich dealer will show you the tires that will save you money. Or write *B.F.Goodrich Tire Company, A Division of The B.F.Goodrich Company, Akron 18, Ohio.*

MORGAN TRUCKS line up at mine tipple. 90% of the company's tires are B. F. Goodrich.

MORGAN SUPT. Glenn Peugh (left) says, "We are 100% satisfied with B. F. Goodrich tires."

Specify B.F.Goodrich tires when ordering new equipment

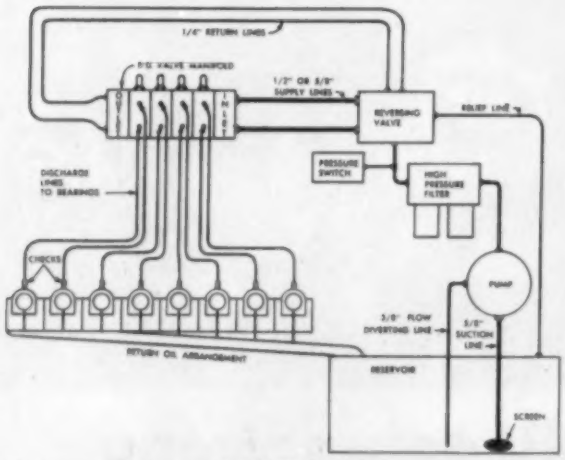
B.F.Goodrich
FIRST IN RUBBER

Your B. F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

speed to any reverse speed at any time and under full power. Top travel speed is 23 mph. Other features of the TL-20D are power steering and four-wheel power brakes which can be operated by either the right or left foot. Power for the TL-20D is provided by an Allis Chalmers diesel developing 100 hp at 2,000 rpm. The 2-yd bucket, which can be independently tipped back at 40 deg at ground level, receives power through a straight line linkage.

Six-Wheel Truck Rated At 60,000 lb

A heavy-duty International six-wheel truck being produced by International Harvester Co. has been designed for off-duty highway operation. A V-8 unit designed with a gross vehicle weight rating of 60,000 lb, the truck has been designated Model VF-230. International says that the VF-230 "has been built to meet the requirements of severe off-highway operation and to absorb the shock of loading by large shovels and draglines." The VF-230's engine is rated at 257 hp. Standard equipment includes a 15,000-lb front axle, a 46,000-lb rear bogie, full-power hydraulic steering, air brakes, a 12-v electrical system, a 60-gal fuel tank, and a 2⅝-in steel grille guard.



Pressure Type Oil Circulating System

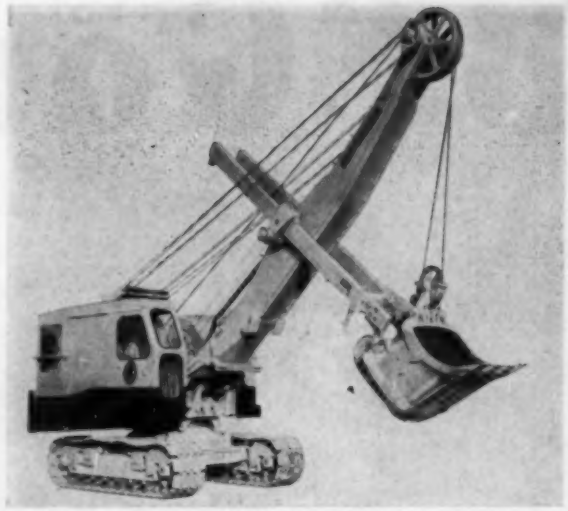
The Farval Corp., Cleveland, Ohio, has announced the manufacture of a new type circulating oil system the company is marketing under the name "Lubrival." The system employs a two-line principle of operation, a standard Farval design, to supply oil under pressure to "Progressive Dualine" measuring valves from which the oil is delivered to bearings. The valves are designed with individual sight indicators. A feature pointed out by the manufacturer is the system's ability to warn of clogged or broken lines through a pressure sensing mechanism. Operation is flexible, since a variable delivery pumping device permits a selection of the number of injections supplied per minute to bearings. Farval says, too, that there is no limit to the number of measuring valves that the system will accept to serve a piece of equipment.

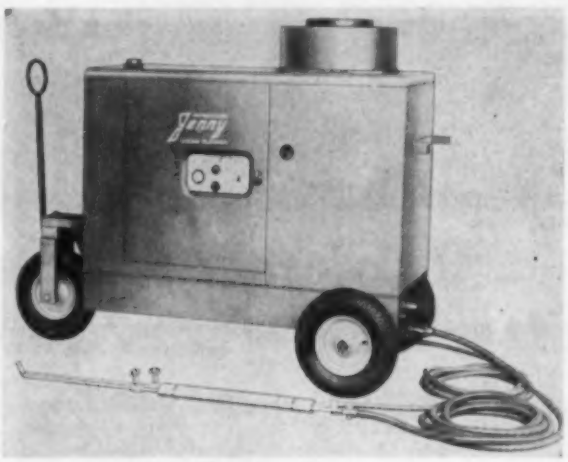
Heavy Duty Ripper Attachment

The Model R-89 ripper, a unit designed for use in heavy duty ripping and for attachment to bulldozers 43 in to 60 in high, has been announced by the Ransome Corp., 2729 Hunting Park Ave., Philadelphia, Pa. Designed to match tractors with 150 hp to 320 hp, the Model R-89 is equipped with a one-man rack and pinion depth adjustment, a standard Ransome feature.

2-yd Crawler-Mounted Excavator

One of the newest Koehring excavators is the 2-yd, crawler-mounted 805 which can be converted to a crane, dragline, clamshell, and shovel. As a dragline the 805's capacities are 2 and 3 yd. As a clamshell capacity is 3½ yd. Equipped with friction type steering brakes that are spring set and air released, the 805 can turn in its own length when one crawler is locked. The unit's bucket is crowded into a cut by a heavy roller chain. Koehring Div., Koehring Co., 3026 W. Concordia St., Milwaukee 16, Wis.





Steam Units Clean, Flush, Rinse

The Series 1800, or the "Hypressure Jenny" steam cleaners manufactured by the Hypressure Jenny Div., Homestead Valve Mfg. Co., Coraopolis, Pa., is designed to deliver 180 gal per hr steam cleaning capacity. The Model 1858 (photo) is one of 11 models. It will deliver flushing and rinsing capacities up to 480 gal per hr. Other models offer single-gun or two-gun operation; still others are made with a choice of oil-fired and gas-fired units in stationary, portable, or trailer-mounted types. For applications where electricity is unavailable, the units are offered with a gasoline-engine drive in place of an electric motor.

Anniversary Truck Line Announced

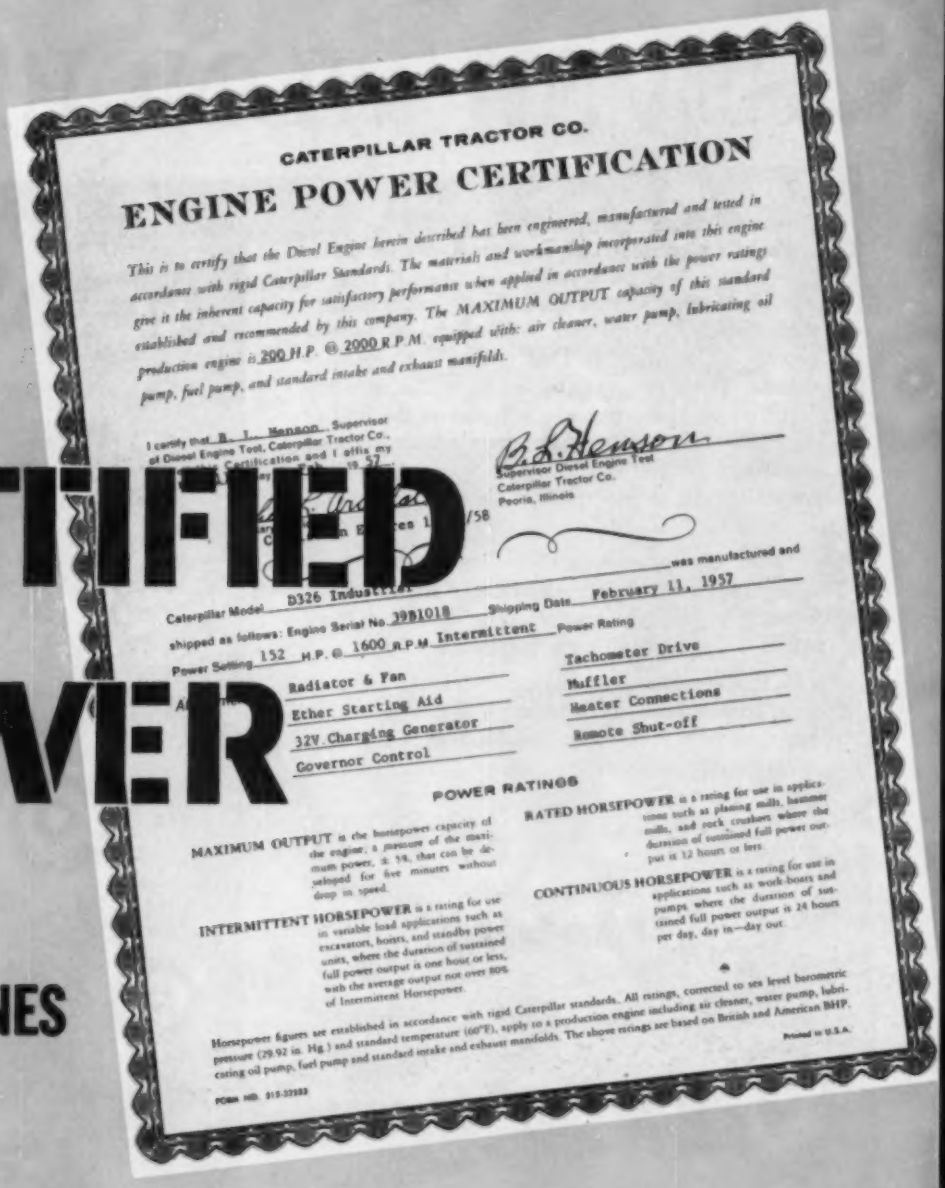
An anniversary line of trucks from half-ton to 33,000-lb gvw units has been announced by International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill. Designed the "A" line, the trucks are manufactured with four-wheel, six-wheel, and all-wheel drive. They can be powered by gasoline or LPG, in horsepower ratings from 112 to 134. Engines are valve-in-head,

(Continued on p 154)

ANOTHER CATERPILLAR FIRST!

CERTIFIED POWER

FOR CAT* DIESEL ENGINES



CATERPILLAR TRACTOR CO.

ENGINE POWER CERTIFICATION

This is to certify that the Diesel Engine herein described has been engineered, manufactured and tested in accordance with rigid Caterpillar Standards. The materials and workmanship incorporated into this engine give it the inherent capacity for satisfactory performance when applied in accordance with the power ratings established and recommended by this company. The MAXIMUM OUTPUT capacity of this standard production engine is 200 H.P. @ 2000 R.P.M. equipped with: air cleaner, water pump, lubricating oil pump, fuel pump, and standard intake and exhaust manifolds.

I certify that R. L. Henson, Supervisor of Diesel Engine Test, Caterpillar Tractor Co., signed this Certification and I affix my official seal this [illegible] day of [illegible], 19 57

[illegible] Notary Public

[illegible] /58

R. L. Henson
Supervisor Diesel Engine Test
Caterpillar Tractor Co.
Peoria, Illinois

Caterpillar Model D326 Industrial was manufactured and shipped as follows: Engine Serial No. 39B1018 Shipping Date February 11, 1957

Power Setting 152 H.P. @ 1600 R.P.M. Intermittent Power Rating

Radiator & Fan
Ether Starting Aid
32V Charging Generator
Governor Control
Tachometer Drive
Muffler
Heater Connections
Remote Shut-off

POWER RATINGS

MAXIMUM OUTPUT is the horsepower capacity of the engine, a percent of the maximum power, ± 5%, that can be developed for five minutes without drop in speed.

INTERMITTENT HORSEPOWER is a rating for use in variable load applications such as excavators, hoists, and standby power units, where the duration of sustained full power output is one hour or less, with the average output not over 80% of Intermittent Horsepower.

RATED HORSEPOWER is a rating for use in applications such as planing mills, hammer mills, and rock crushers where the duration of sustained full power output is 12 hours or less.

CONTINUOUS HORSEPOWER is a rating for use in applications such as work-boats and pumps, where the duration of sustained full power output is 24 hours per day, day in—day out.

Horsepower figures are established in accordance with rigid Caterpillar standards. All ratings, corrected to sea level barometric pressure (29.92 in. Hg.) and standard temperature (60°F), apply to a production engine including air cleaner, water pump, lubricating oil pump, fuel pump and standard intake and exhaust manifolds. The above ratings are based on British and American BHP.

FORM NO. 919-22989

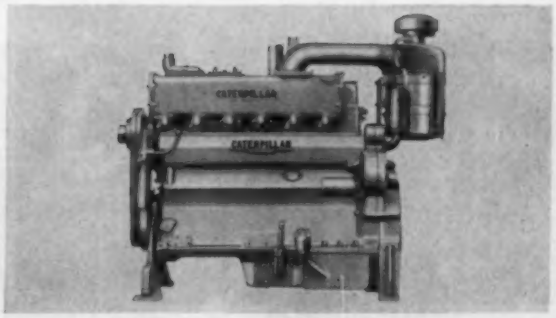
Printed in U.S.A.

In a quarter century of diesel leadership Caterpillar Engines have achieved a reputation for *honestly rated power*. Owners have found that they can depend on a Cat Diesel to deliver the power promised.

Now, to back this reputation, Caterpillar becomes the *first* manufacturer to issue a certificate showing the horsepower capabilities of the engine. This certificate is signed by Caterpillar Tractor Co. and certified by a notary public.

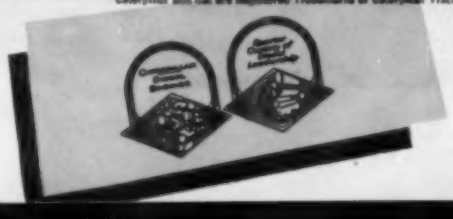
You have a right to demand *certified power* when you invest in an engine. You get it when you buy from your Caterpillar Dealer. Let him show you the certified power plant that fits your needs.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



SEVEN WONDERS OF THE

. . . developed with the help of the World's Greatest Lubrication Knowledge!

A giant wind tunnel that "flies" jets at supersonic speeds . . . a submarine that runs on nuclear power . . . a machine that makes genuine diamonds. These are some of the scientific wonders pictured on these pages. Each one is *the first of its kind*—designed to add to man's knowledge of the world around him. And each was developed with the help of Socony Mobil's vast lubrication knowledge.

When new machines are being planned . . . when unknown problems of lubrication lie ahead —machine builders and machine operators have found it pays to call on Socony Mobil.

Whatever *your* lubrication problems, large or small, we're ready to help you solve them . . . to improve your production, reduce costs through a program of *Correct Lubrication.*

SOCONY MOBIL

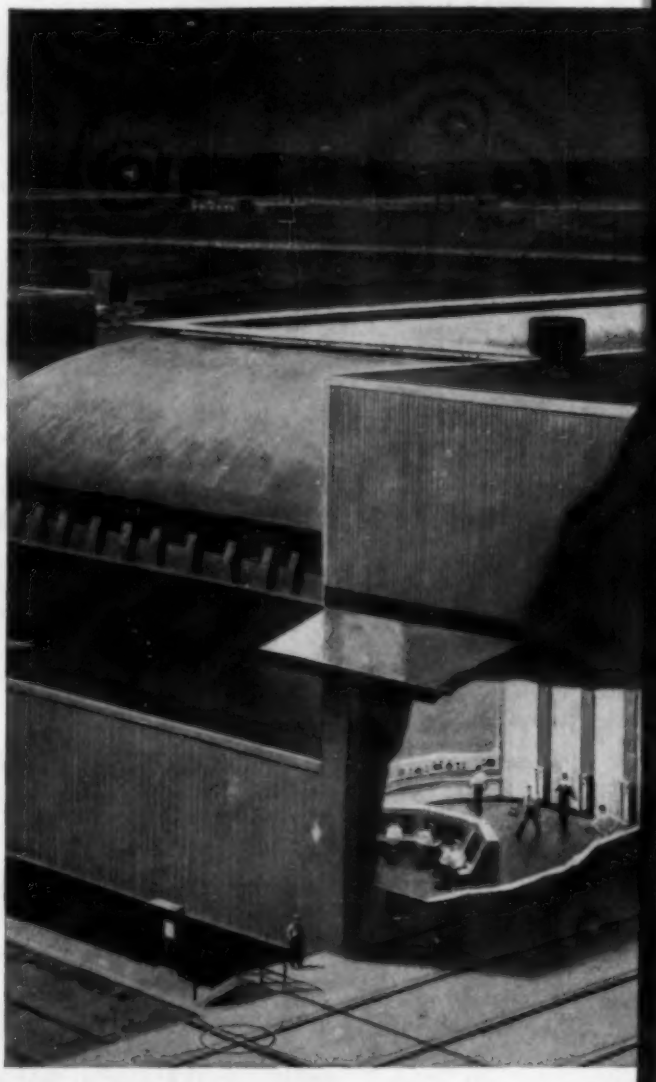
Mobil

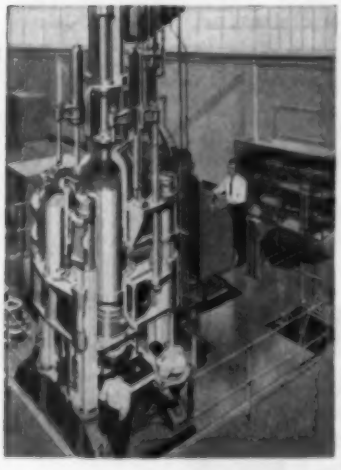
Correct Lubrication

FIRST STEP IN CUTTING COSTS

Leader in Lubrication for 91 Years

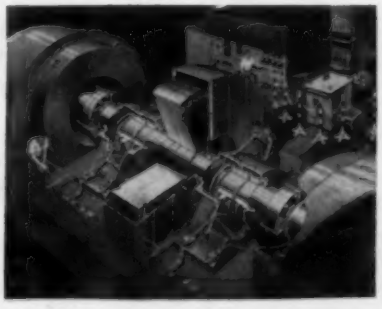
SOCONY MOBIL OIL COMPANY, INC., and Affiliates:
MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION, MOBIL OVERSEAS OIL COMPANY, INC.





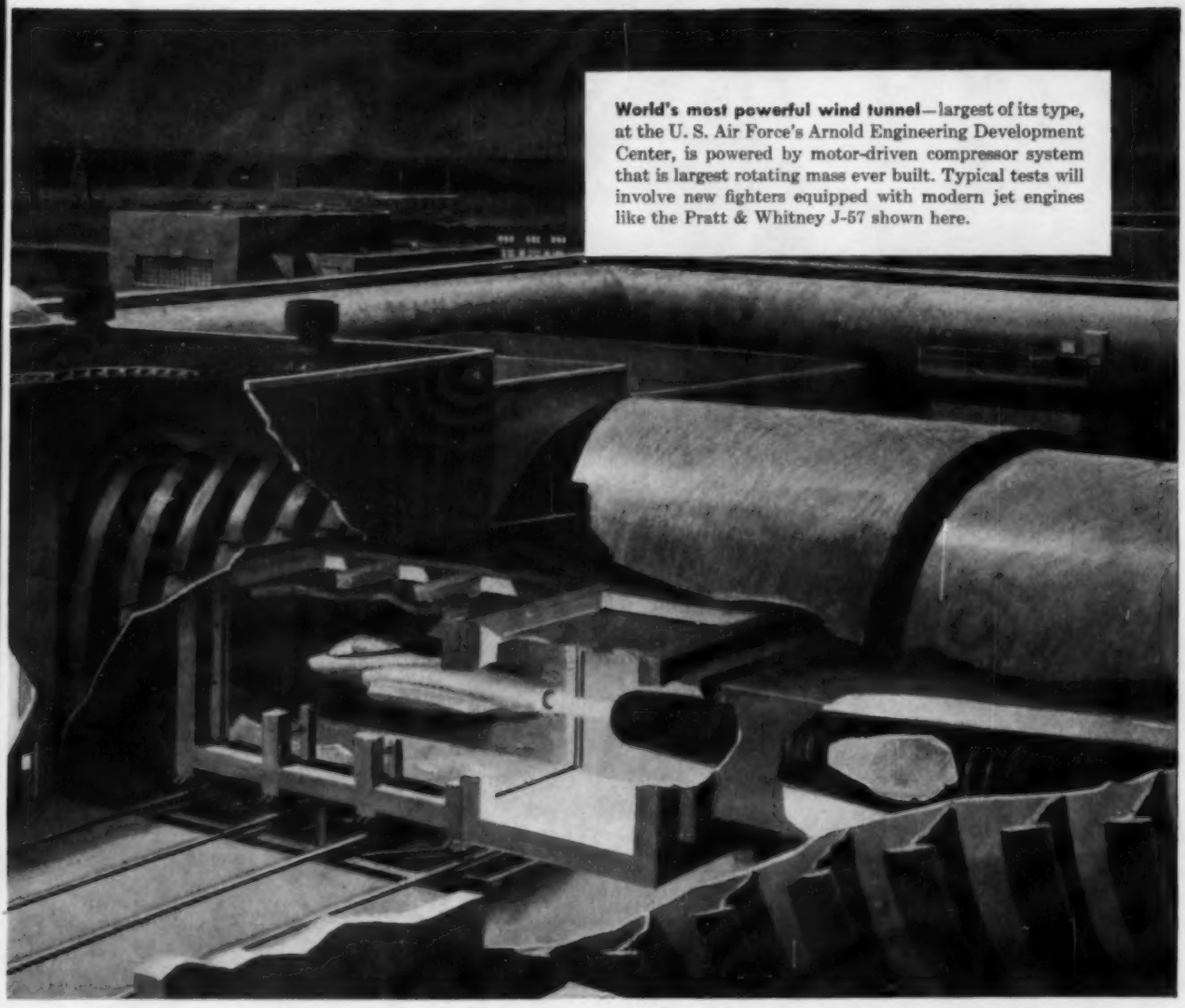
World's first atomic-powered submarine —U.S.S. Nautilus travels on power generated by fissionable material.

World's only diamond-making machine —develops up to 1,500,000 lbs. pressure and 5000°F. temperatures to create genuine diamonds.

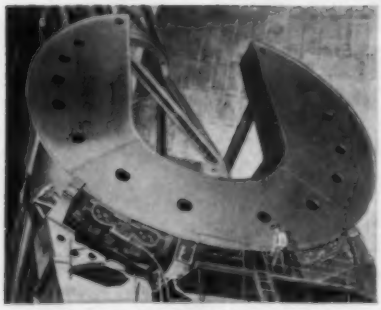


Giant atomic accelerator—the Cosmotron at Brookhaven National Laboratory is powered by a Mobil lubricated Westinghouse Motor Generator.

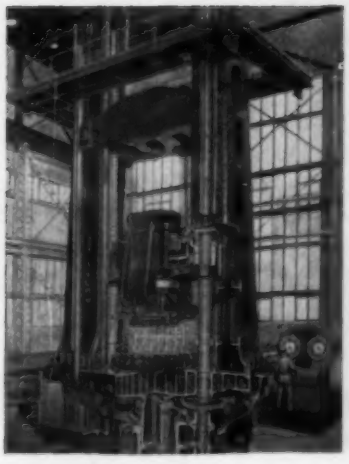
SCIENTIFIC WORLD

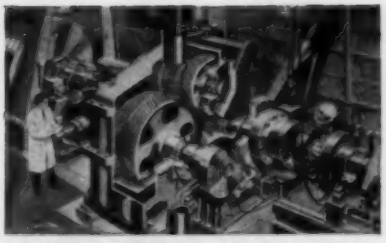


World's most powerful wind tunnel—largest of its type, at the U. S. Air Force's Arnold Engineering Development Center, is powered by motor-driven compressor system that is largest rotating mass ever built. Typical tests will involve new fighters equipped with modern jet engines like the Pratt & Whitney J-57 shown here.



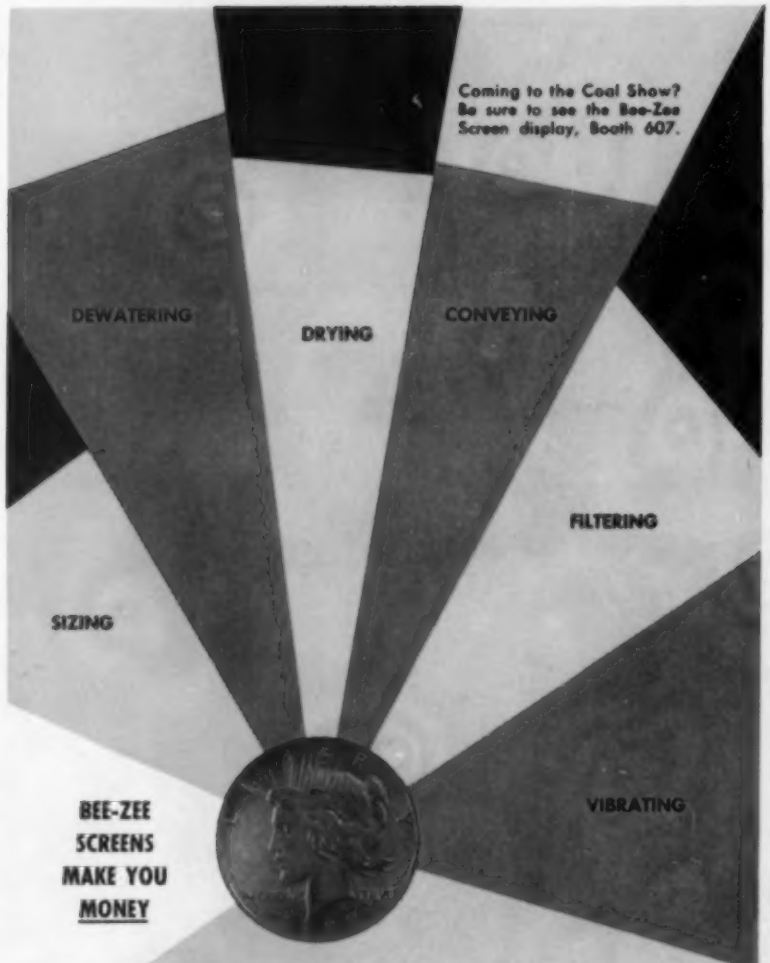
World's largest telescope at Mount Palomar Observatory has 200" lens, weighs 500 tons. It floats on microscopic film of Mobil D.T.E. Oil.





World's largest dynamometer tests brake materials under varying pressures, speeds and temperatures. 200-ton machine is 100% Mobil protected.

World's largest testing machine can apply a tensile or compressive force of up to 5,000,000 lbs. to test full-scale sections or complete units of every type.



You'll find stainless steel Bee-Zee Screens everywhere in coal processing operations. They're separating with a precise, almost unbelievable accuracy. They're dewatering with a thoroughness that keeps BTU-counting coal customers happy. They're fitted to every type of equipment . . . electronically precision-welded into every conceivable shape, in every needed dimension.

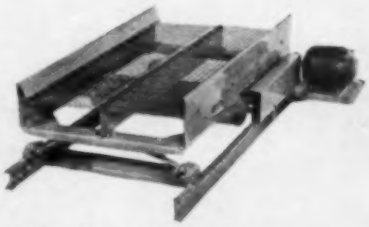
And in every application, famous Bee-Zee Screens are responsible for extra dollars of profit. Find out how it can happen to you by writing, wiring or phoning Galesburg 4397 collect. Ask for the new catalog, "Bee-Zee Screens Make You Money."

BIXBY-ZIMMER
ENGINEERING COMPANY
157 Abingdon Street, Galesburg, Illinois

ROUND-ROD SCREEN long-life accuracy
GRIZZLY-ROD SCREEN rugged accuracy
TRI-ROD SCREEN knife-like accuracy
ISO-ROD SCREEN prolonged accuracy
GRIZZLY ROD WITH SKID ROD ruggedest accuracy

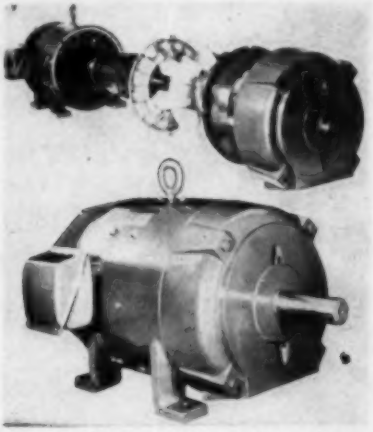
Equipment News (*Continued*)

six-cylinder units. The "A" line, according to the company, comprises the "light" portion of International's line of trucks, since the company makes vehicles up to 96,000 lb gvw. The Model ACF-180 six-wheeler above is rated at 30,000 to 33,000 lb gvw. It is powered by a 154-hp Black Diamond engine. Wheelbases range from 137 to 185 in. Design features include a 65-in wide cab, and a "Sweep-Around" windshield.



Vibrating Screen

A reportedly inexpensive vibrating screen manufactured by the Universal Vibrating Screen Co., Dean Blvd. and St. Paul, Racine, Wis., is named the Type "CS." The screen is designed for use in by-passing fine material and for light scalping requirements. Measuring 3 ft by 5 ft, the unit is equipped with a 1-hp motor, V-drive, and motor bracket. It operates at 1,800 rpm, and will accept either steel wire cloth or perforated plate. With motor and drive included, the screen's entire weight is 530 lb.

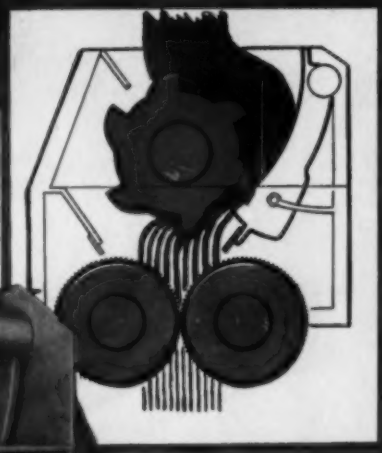


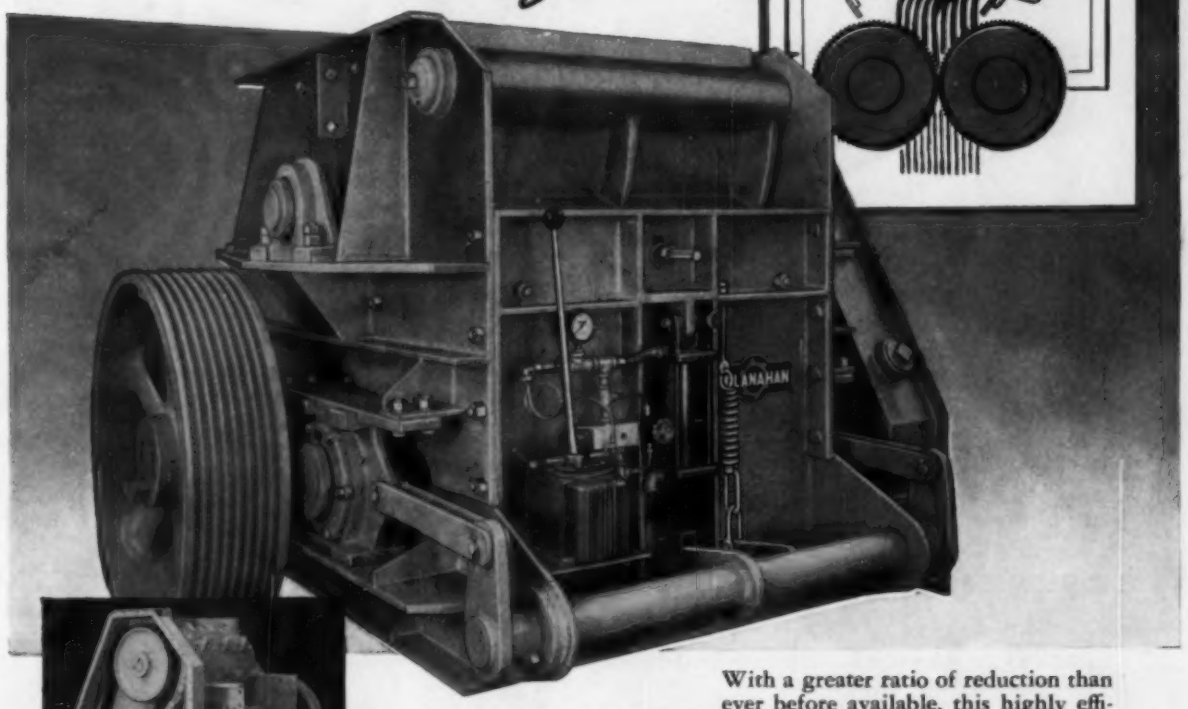
Designed For Dual Tasks

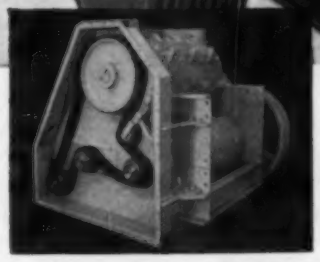
The "Life-Line H Series" of DC industrial motors and generators departs markedly from traditional design, according to the manufacturer, Westinghouse-Electric Corp., Box 2278, Pittsburgh 30, Pa. The units are designed, says Westinghouse, to be equally effective as basic prime movers or as elements of highly complex automatic production systems. The motors and generators have drip-proof enclosures as standard equipment; Motor horsepower spans the gap between 1 and 150 hp; generator ratings range from ¾ to 100 kw. Among features said

NEW

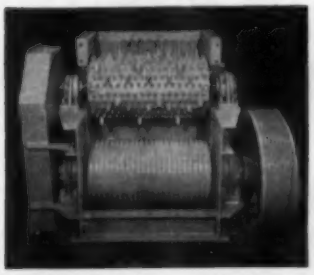
Reduces RUN OF MINE COAL *to* as small as *½" size*







One drive, running in a sealed oil bath, operates all three rolls.



Simplicity of design was of prime consideration in developing this crusher.

With a greater ratio of reduction than ever before available, this highly efficient crusher delivers a better product with a minimum of fines. An 18" diameter single roll crushes primary feed against a curved crushing plate; and two 18" diameter rolls perform the secondary reduction. Product size can be controlled quickly from ½" to 6" by a unique hydraulic adjustment system. *Write for Bulletin No. BDTR-57.*

McLANAHAN

BLACK DIAMOND

TRIPLE ROLL CRUSHER

McLANAHAN and STONE CORPORATION

Hollidaysburg, Pennsylvania

Pit, Mine and Quarry Equipment Headquarters Since 1835

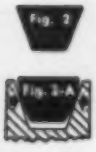
See this Crusher at the Coal Show!

Why *concave sides* insure longer V-Belt life

With one simple test you can demonstrate to yourself why the concave sides (Fig. 1) of the Gates V-Belt insure far longer belt life.

Just feel the sides of a Gates V-Belt on the bend. Note that in bending around the sheave these sides fill out and become straight (Fig. 1-A). That means the belt makes full contact with the sides of the sheave groove; grips the sheave *evenly*.

This even contact distributes wear uniformly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.



Now make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating wear at the points shown by arrows. Uneven wear shortens belt life; increases belt costs.

Cut V-belt replacement costs and down time. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope — the V-Belt with concave sides.

The Gates Rubber Company • Denver, Colorado

World's Largest Maker of V-Belts

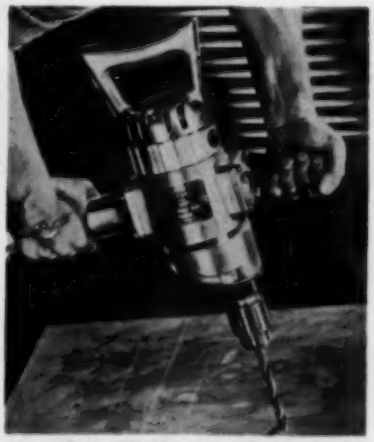
There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 150

Gates Vulco Rope Drives

Equipment News (*Continued*)

to be standard in industrial motors and generators for the first time are a high temperature silicone insulation system rated to operate within Class B temperatures; a controlled ventilation system that draws air from the drive end; and a new housing construction which permits the drip-proof machines to serve many applications ordinarily requiring splash proof equipment.



Hand Drill Power Boosted

Three portable electric drills said by the manufacturer to make all other drills of like capacity obsolete have been announced by the Black & Decker Mfg. Co., Towson, Md. The drills are ½-in, ⅝-in, and ¾-in models. Black & Decker points out these features: 1) up to 139% more power to maintain both torque and speed under load; 2) a three-position, built-in reversing mechanism for equal power drive in forward and reverse.

One-Piece Bit and Steel

Carbide-tipped Intra-Set drill steels are recommended by the manufacturer, Brunner & Lay, for drilling rock bolt holes and small blast holes. Bit and steel are one piece. The company offers the steels as four-point integral units and as a chisel type. Address: 9300 King St., Franklin Park, Ill.

Threaded Inserts Lock In

The Nylock Corp. has increased the range of threaded inserts employing the company's self-locking principle. Sizes

Carbon steel formerly used in this Simplicity aggregate drier wore out from smashing impact after handling 1¼ million tons of crushed dolomite but life expectancy is now over 4 million tons. Drier operates in one of the plants of The J. E. Baker Co.

Lukens "T-1" steel triples life of rock drier

TRADEMARK

Are impact and abrasion shortening the life and rocketing the costs of your equipment? If so, there's a lesson here for you:

When the liner shell and partition plates of this 10 x 20 foot Simplicity aggregate drier were replaced with Lukens "T-1" steel, life expectancy increased threefold!

Whether you handle stone, coal, or metal ores, it will pay you to investigate Lukens "T-1" steel for surfaces hard-hit by impact and abrasion. The 321 minimum Brinell quality has been known to outlast ordinary steels by 18 to 1. Applications are many throughout the materials handling and processing industries. Wear plates, chutes, hoppers, and mine cars are typical.

The remarkable combination of hardness and toughness in this high yield strength, readily welded alloy steel is even maintained at temperatures well below zero. *Send for informative illustrated booklet, "Lukens 'T-1' Steel." Write Manager, Marketing Service, Room 902, Lukens Steel Company, Coatesville, Pennsylvania.*

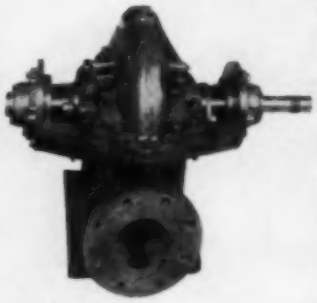
LUKENS

Helping industry choose steels that fit the job

PUMPS . . . *remember* FLOOD CITY

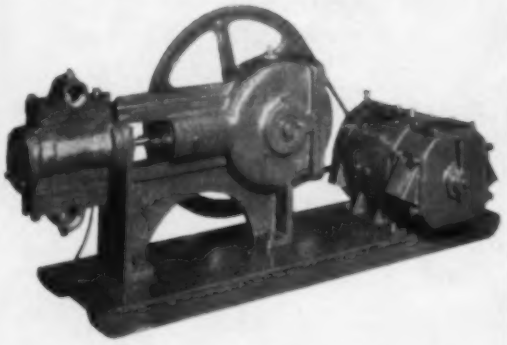
• For over 50 years we have been designing, building and repairing pumps of all types and sizes. Users recognize Flood City pumps for their efficient and trouble free service. When next you need a pump—remember FLOOD CITY.

CENTRIFUGAL PUMP



• FLOOD CITY CENTRIFUGAL PUMPS are dependable and designed by mining men for exacting mine service. Made in sizes up to and including 6" discharge with capacities up to 1500 gallons per minute. Pump bodies and operating units are furnished in either acid-resisting bronze or stainless steel.

PLUNGER PUMP



• FLOOD CITY gathering type PLUNGER PUMPS are light, compact, rugged and dependable. This pump has many uses above or below ground. A double acting reversible water end can be specified in the material best suited for your application. The suction and discharge chambers can be quickly reversed so the pipe connections are in the position required. The self lubricating power frame is protected from wear at the crosshead fit by a cast iron sleeve. This power frame is shielded to prevent any entrance of damaging liquid or dirt.

We also manufacture a complete 5" x 5" plunger pump where more capacity is needed.

FLOOD CITY AUTOMATIC SYSTEM for operating CENTRIFUGAL PUMPS COSTS ONLY ABOUT ¼ THAT OF A VACUUM SYSTEM

Here's the new and inexpensive way to automatically operate your centrifugal pumps. Easy to install, and requiring only occasional inspection and maintenance, this system eliminates costly vacuum pumps.

Let a Flood City engineer supply you with all the details . . . there's no obligation . . . simply write or call.

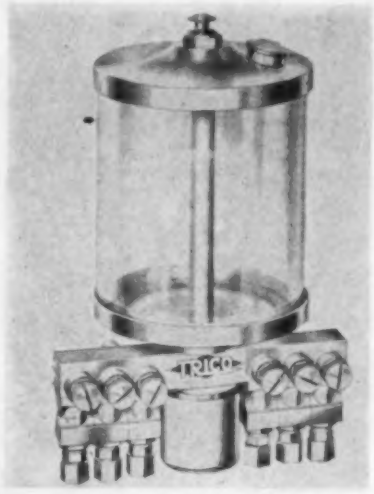
SEE US IN BOOTH 817— AMERICAN MINING CONGRESS • CLEVELAND MAY 13-16

FLOOD CITY BRASS & ELECTRIC CO. JOHNSTOWN, PA.

Sales Agent: KANAWHA RAIL & MACHINERY CO., CHARLESTON, W. VA.

Equipment News *(Continued)*

as small as No. 0 are now available. The inserts eliminate the need for special tools, and can be installed in a standard threaded hole. A screw driver is used to remove them. The insert locks by means of a nylon pellet imbedded in the body of each insert. The pellet projects beyond the external threads, and, when engaged is compressed into the threads.



Multiple Point Oiler

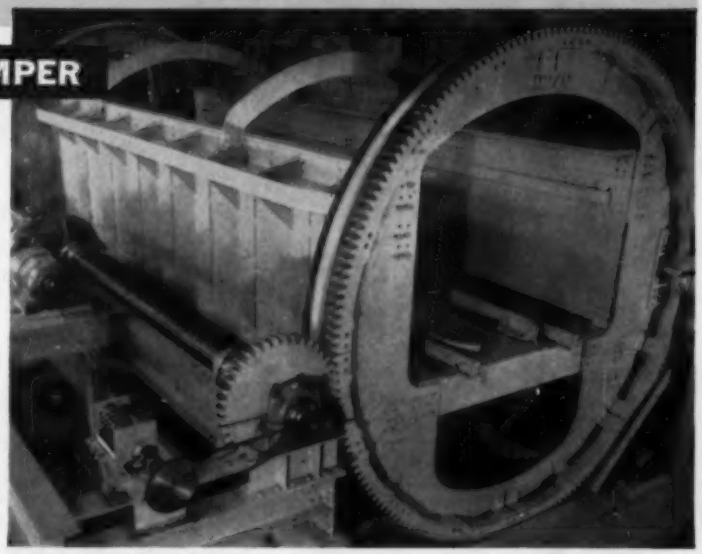
A simply-designed, therefore simply-operated system of feed control is the important point about the improved Trico multiple feed oilers. The simple design is the company's tapered feed adjustment screw, which can be adjusted with finger-tip rather than wrenches. Control, however, may be automatic or manual, the automatic being a type of electric solenoid control. Trico Fuse Mfg. Co., 2948 No. 5th St., Milwaukee 12, Wis., will manufacture the system equipped with from 1 to 24 outlets.

Aluminum Grating

A structural grating that remains rigid regardless of cutouts made in any part of the complete panel is being produced by the Klemp Metal Grating Corp., 6601 So. Melvina St., Chicago 38, Ill.

THE NOLAN PROFIT-PAIR
to meet modern mining requirements

NOLAN ROTARY CAR DUMPER



The newest, safest design in high-speed dumping through full 360° arc. Fully automatic with selective manual control. The result of 50 years of Nolan experience and progress in mine car dumping and control equipment.

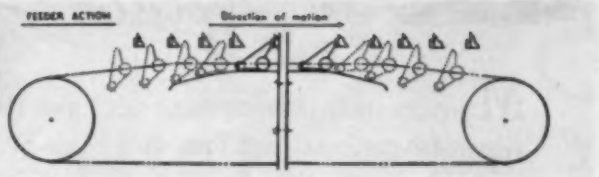
FEATURES:

—Designed for Today's High Capacity Mine Car
—Gear Driven through Flame Hardened Gears
—Complete with Base Frame, Dump Sheets, and Liner Plates
—Anti-friction Bearings Throughout
—Wide Faced Dump Rings of Special Alloy Steel
—Equipped with Nolan Patented Cushioned Rail Aligning Stop

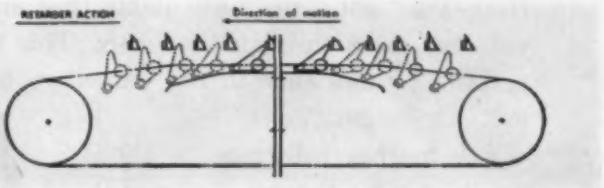
NOLAN CUSHION-ACTION TRIP FEEDER-RETARDER

The NOLAN Cushion-Action Feeder-Retarder makes possible the easy, accurate control of mine cars . . . and eliminates the wracking, jolting, inflexible action so common in ordinary chain control types.

Through the ingenious design of dogs, rails and chain, the feeding and retarding of mine cars becomes an easy, gentle, positive action. The diagrams at the right picture the Cushion-Action of this new NOLAN advancement, available only through NOLAN. Consult us for adaptation of the new NOLAN Cushion-Action principle to your particular feeder-retarder problems.



Feeder dog is pivoted on pin carrying outboard rollers of chain. Tail of dog has roller. Third track under center of chain governs position of dog with relation to vertical. Note difference in angle between chain track and dog track. As dogs progress along their track, they gradually assume an upright position and engage their respective pusher pads. At other end of frame, dogs ***gradually*** drop away from their pads. No straining, jolting or jarring as dogs engage and disengage.



Retarder dogs operate on same principle as feeder dogs and are situated adjacent to them. Gradually assume upright position and engage their respective retarder pads, holding back cars firmly and steadily. At end of chain, retarder dogs ***gradually*** drop away from their pads, without snapping or wracking of cars.

NOLAN AGENTS:

Huntington Supply & Equipment Co.
Huntington Nat'l Bank Building
Huntington, West Virginia

John Lloyd & Sons
33 Bennett Building
Wilkes-Barre, Pennsylvania

E. C. Horne Machinery Company
1726 Champa Street
Denver 2, Colorado

George C. Hutchinson, Jr.
1304 Koenan Building
Pittsburgh, Pennsylvania

Frank C. Memmott
P. O. Box 154
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Amos A. Culp
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John North Associates
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Harbert, Michigan
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THE NOLAN COMPANY
BOWERSTON, OHIO

NOLAN

Transite
Mine Service Pipe

Stubbornly resists corrosion

MINE OWNERS AND OPERATORS have found from years of experience that Transite® Mine Service Pipe protects against frequent replacements due to corrosion.

Made of asbestos and cement, Transite is highly corrosion-resistant *all the way through*. It is strong and durable yet light in weight, easy to handle. Its Ring-Tite® couplings form joints that are flexible yet stay tight through the years. This flexibility permits conformance to the curves so frequently met in mine gangways.

For further information about Transite Mine Service Pipe and its use for mine drainage, water supply or other service write for Brochure TR51-A, Johns-Manville, Box 14, New York 16, N.Y.

JM Johns-Manville

TRANSITE Mine Service Pipe

WITH THE RING-TITE COUPLING

Equipment News *(Continued)*

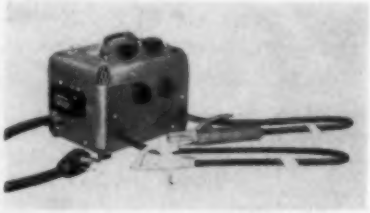
The grating is made of aluminum and is designed "to retain the combined advantages of a rectangular opening and riveted gratings." Its design permits 79% clear opening to eliminate accumulations of dirt, oil, etc. in corners. In addition to its application as a floor, the grating may be used as a room divider or window visor, Klemp points out.

Highly Accurate Theodolite

Highest accuracy and unusal versatility—these are the most important features of the new Wild T-3 precision theodolite. The company, Wild Heerbrugg Instruments, Inc., Port Washington, N. Y., also points out the instrument's past record of reliability under the most rigorous climatic conditions. Features of the T-3 are a circle reading direct to 0.2 sec, telescopic magnification of 24x, 30x, and 40x, and no eccentricity error.

Oxyacetylene Cutting

A light duty oxyacetylene cutting attachment, the Airco Style 1490, is designed to attach to the Airco Style 400 lightweight welding torch. The cutting attachment's weight is 13 oz, its length 9 in. Cutting range is up to 1-in thick steel. Features: brass head and body plus a removable mixer for easy cleaning.



Portable Welders

Power Arc Corp., Peoria, Ill, is making small, compact, portable welders recommended for general maintenance repair work. The model 200 A delivers 200

"Be sure to see the latest V-R developments in carbide tipped coal mining bits when you visit the Coal Show—Cleveland, May 13-16.

"There will be experienced V-R mining men on hand to discuss your problems and requirements.

"I'll be looking for you there."

Vascoloy-Ramet Corporation

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

872 Market Street • Waukegan, Illinois

MANUFACTURERS OF CEMENTED CARBIDES • CUTTER BITS • FINGER BITS • AUGER BITS • ROTARY BITS • ROOF BITS • PERCUSSION BITS • CARBIDE INSERTS

M-599

TOUGH MACHINE FOR A TOUGH JOB

Maneuverability around the shovel—plus power aplenty for high travel speed loaded—are two of many reasons why the DW21-PR21 delivers high production. The PR21 has a rated capacity of 22.5 cu. yd. heaped or 31 tons.

CAT* DW21 Tractor with Athey PR21 Rear Dump Trailer delivers high production for Newport Excavating Co., Nanticoke, Pa.

This is one of two DW21-PR21 units used by the Newport Excavating Co., in its own pit operation in Sheatown, Pa. This pit is down more than 100 feet. Shovel loaded, each DW21-PR21 handles a rated 22.5 cu. yd. of rock a load and hauls it 300 yards up a 7½% grade to the dump. Average cycle time per unit on the 600-yard round-trip haul: 6½ minutes. Both units work 24 hours a day, 5 days a week, 12 months a year.

Perfectly matched with the rugged PR21, the new Caterpillar DW21 (Series C) has a modern, heavy-duty Turbocharged diesel engine that develops 300 HP (maximum output)—power aplenty for fast cycle times even on adverse hauls. What's more, because of its 4-cycle design, the engine delivers *dependable* power day after day with a minimum of maintenance. No fuel system adjustments are required. There are no cylinder ports or air boxes to clean. And low-cost No. 2 furnace oil can be used without fouling. Among other factors that lessen maintenance and boost production: 90-degree, automotive "feel" steering for fast, accurate maneuvering around the shovel; hydraulic controlled dumping fast, clean and safe, and wide-section 29.5-29 tubeless tires for maximum traction in tough going. The tubeless tires also eliminate an estimated 80% of down time caused by old-fashioned tires!

For fast cycle times and steady production, you can't beat the DW21-PR21 in rock work. Your Caterpillar Dealer, who backs you with prompt service and parts you can trust, will gladly give you complete details of its performance. Call him today!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

HEAVY-DUTY EQUIPMENT FOR THE HARD WORK

Equipment News (*Continued*)

amp on a 230-v line, 180 amp on 115-v or 208-v lines. The 200 A weighs 65 lb, has a maximum 25-v output for contact or arc welding, and is said to eliminate completely danger from electricity. A larger unit, the Model 400, operates on 440-v or 230-v lines.

Worm Gear Speed Reducer

Tulsa Winch Co., Tulsa, Okla., is making a new worm gear speed reducer that incorporates antifriction ball bearings both for input and output shafts. Named Model G4S, the reducer provides a 29:1 reduction, is rated at 875 lbs ft output torque, and is designed for intermittent operation. Its weight is 36 lb because of a cast-aluminum, rather than steel housing. Tulsa says the G4S may be driven by electricity, gas, hydraulic motor, by manual operation, and by a single-speed power take-off.

Portable Bucket Pump

A portable bucket pump featuring the "Adjusto Lever," a device which permits pumping oil and grease in the coldest weather at pressures 2,500 to 5,000 lb, is being manufactured by the Alemite Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill. One wrench disassembles the entire unit, which is available in seven models for all types of lube fittings. A foot valve assures full pressure at every stroke using any lubricant in any weather, according to Alemite.

Oiling Rate Held Constant

A constant level electro-oiler manufactured by the Oil-Rite Corp., 2391 Waldo Blvd., Manitowoc, Wis., is said

An Announcement

Fairmont Machinery Company, for 60 years designer and builder of complete cleaning plants, is now the exclusive manufacturer and sales agent for Chance Cones in the United States.

Designed to economically and accurately size and clean coal, the system employs the widely known and highly regarded Chance Sand Flotation Process . . . a process which recovers almost 100% of salable coal.

This addition marks another step in Fairmont's effort to improve and enhance the Company's service to the coal industry. Fairmont engineers are ready to help with present and future Chance plants—call, write or

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AMERICAN MINING CONGRESS
MAY 13-16 — CLEVELAND

FAIRMONT
MACHINERY COMPANY
FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

Equipment News (*Continued*)

by the maker to be an effective means of precision lubrication. Oil-Rite points out that the feed rate of conventional gravity feed oilers changes as the reservoir level is lowered. The change is caused by the varying levels of oil within a reservoir. The constant level electro-oiler above is said to eliminate any variation in drop feeding, since the oil which feeds the sight feed valve is always at the same level, a level which is maintained in the base of the reservoir. Operation of the oiler is based on the liquid seal principle. When the oil level recedes because of oil consumption, the liquid seal on the spout is temporarily broken. This permits air from the air intake to enter the oil reservoir, releasing oil until the seal and the proper level is again restored. Up to 24 sight feed valves can be attached.

Remote, Automatic Control

So-called "expandable" safety panels designed to operate automatically unattended or remotely-controlled engines, e.g. pumps, air compressors, generator sets, are being manufactured by the Instrument Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill. The panels are made for both battery and magneto ignitions, as well as for

diesels. Pre-cut holes in which tachometers, meters, instruments, and gauges can be inserted are one of the panel's features. Clogged oil lines, an inoperative oil pump, lack of oil, clogged radiators, broken fan belts—all can be detected before engine damage occurs.

These giants move mountains and . . .

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WHITMORE'S LUBRICANTS

keep these giants moving smoothly . . .

1. Gear Protective Composition for use on open gears
2. Anti-Friction Composition for use on sleeve, ball or roller bearings, high or low speed
3. Lubricants for reduction gear units
4. Pressure-Proof Lubricants (Super E.P.) for heavy duty trucks and tractors
5. Cable Lubricants for use on wire ropes and cables
6. Our New Liquid Gear Composition can be applied without heating, by painting, pouring or by automatic lubricator

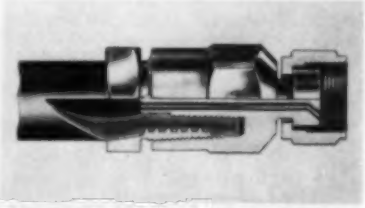
Serving the Mining Industry for over 60 years

WHITMORE'S
PRESSURE-PROOF
LUBRICANTS
SUPER E.P.

THE WHITMORE MFG. CO., *Factory and General Offices*, CLEVELAND 4, OHIO, U. S. A.

Plastic Face Shields

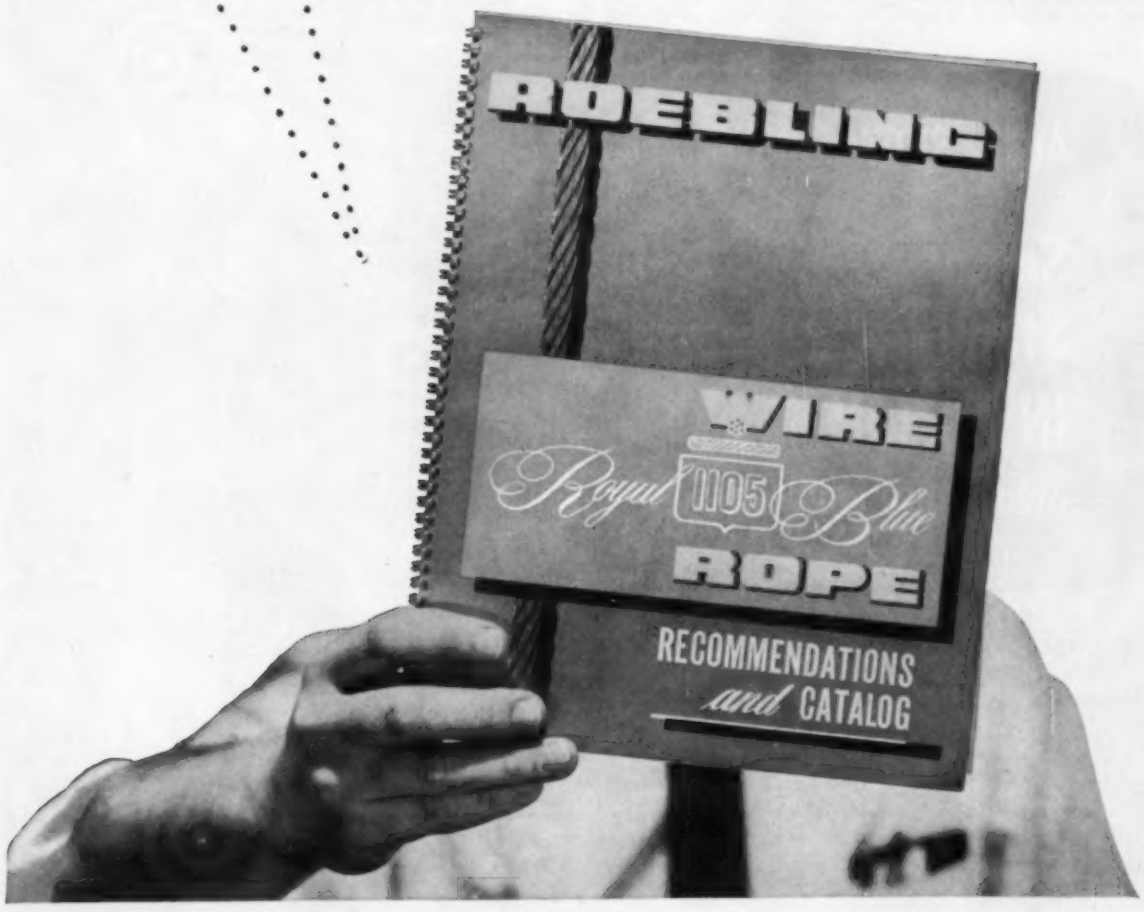
The manufacturer of Pulmosan face shields, Pulmosan Safety Equipment Corp., 644 Pacific St., Brooklyn 17, N. Y., lists a number of points in support of reported product superiority. They are: 1) a soft plastic headframe which molds to any shape; 2) an all-plastic spark deflector; 3) a slide adjustment for headsizes 6 to 8, 4) a foam rubber snap-connected sweatband; 5) an extra wide acetate visor; 6) a design that permits use with pescription glasses.



Hose Skiving Eliminated

"Surgepruf," a line of medium-high and high pressure hydraulic hose and hose couplings has as its main feature

"Use **wire rope?** Get this helpful **recommendations book!"**



"Roebling Wire Rope Recommendations and Catalog" is designed to simplify the selection and ordering of the right wire rope for specific applications—whatever they may be.

The best wire rope for top performance on any job shows up at a moment's notice . . . making the right choice is easy as flipping the tabbed pages of this easy-to-follow, 56-page book. Besides, there's a simple, foolproof, coded ordering system, which identifies the desired size, grade and construction.

May we send you your copy? Mailing the coupon will bring it to you at once. And should the catalog prompt any question on which you'd like further information, field men from your nearest Roebling office or distributor will, of course, assist you . . . or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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Trenton 2, New Jersey

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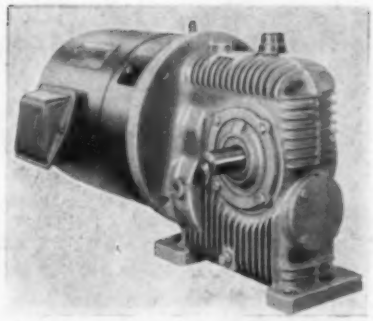
what its maker, Alemite Div., Stewart-Warner Corp., calls "double-wedge grip." For buyers, this means the elimination of skiving rubber-covered wire braid hose. The couplings, which can be used again and again, bite through a rubber cover, gripping single or double wire braid hose, and neither weakening the hose's protective cover nor destroying the water-proofing qualities.

Sump Pump Motor

A sump pump motor, capable of underwater operation, but designed to operate partly submerged is in production at General Electric's General Purpose Motor Dept. The motor, designated as Design 2/50, is built with its starting switch controlled by a weight and float arrangement. It is light enough for hand-carrying, is corrosion-resistant, and is designed with an overbolt construction for rigidity.

Right-Angle Gearmotor

The chief features of a new line of right-angle gearmotors being introduced by the Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio., are designs for space-saving and



shock-absorbing. The gearmotors are being manufactured in 1- to 10-hp sizes for continuous duty, and 1- to 30-hp sizes for intermittent duty. Other available features are horizontal mountings, vertical mountings, and hollow shafts.

"At The SHOW or DOWN BELOW"

See a
Stamler Car Spotter
IN ACTION and you'll see why
Stamler users order again and again!

STAMLER equipment increases tonnage. STAMLER equipment reduces costs. STAMLER equipment operates at the lowest possible maintenance figure. That's why the big preference is for STAMLER. There's a Stamler Car Spotter in use somewhere near you. *See it in operation and you'll understand why STAMLER out-performs all other loading point equipment.* The STAMLER Hydraulic CAR SPOTTER has been in use twice as long as any other! The STAMLER Hydraulic AUTOMATIC LOADING STATION is the only successfully manufactured time-proven production item of its type! Used in combination, this equipment will load your cars automatically, uniformly and without spillage. *No lost time . . . no needless labor at the loading point.* See STAMLER equipment in action and you'll be quick to figure out how much it can contribute to greater loading efficiency in your own mines.

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CAR SPOTTERS

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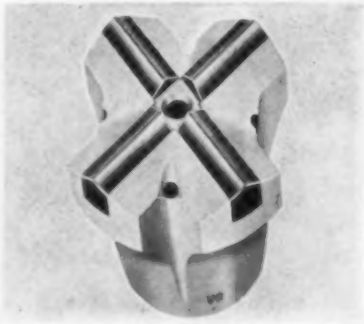

Bit Eliminates Rifling

A new series of rock bits with tungsten carbide inserts made to fit directly on Type 000 and 1000 series steels has been announced by Vascoloy-Ramet, Waukegan, Ill. Designed with inserts mounted in an "X" formation, the new bits eliminate rifling and provide uniform, round holes in hard ground. Designated V-R "X", the bit features five-hole construction.

Five-Port Control Valves

Three "Quick-Dump" control valves manufactured by Humphrey Products Div., General Gas Light Co., Kalamazoo, Mich., are designed as four-way, five-port models containing no internal springs, packing, pistons, and sliding contracts. Two of the valves are electrically

Reynolds Aluminum mine service pipe

- **Light weight cuts installation cost**
- **Resists corrosion—lasts longer**
- **Non-sparking**
- **Quick coupling—flexible**

Aluminum pipe is the answer to lower costs in mine drainage. In actual use, under conditions that rendered steel pipe useless in three months, aluminum pipe showed almost no corrosion effect after two years.

Three feet of aluminum pipe weigh only as much as one foot of steel. This light weight means handling ease under the most difficult conditions, often permits one man to do jobs that formerly required two or three. Quick coupling devices further simplify use and speed laying or taking up.

Aluminum's flexibility makes strip mine installation faster, easier.

3" aluminum pipe installed by one man in 36" coal.

One man easily carries two 20 foot aluminum pipe sections.

For informative brochure "Reynolds Aluminum Mine Service Pipe", write Reynolds Metals Company, P.O. Box 1800-NQ, Louisville 1, Kentucky.

REYNOLDS ALUMINUM

See "CIRCUS BOY", Reynolds dramatic series, Sundays on NBC-TV

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Equipment News (*Continued*)

operated, the third is equipped with a hand lever. The electric models are equipped with new type electro-magnetic armatures rather than solenoids. One of the electric valves, a "momentary impulse" type, is operated by a single electric impulse which opens one valve section and closes the other. No current is required to hold the valve open or closed. The second electric valve holds as long as current is on.

Pump's Applications Many

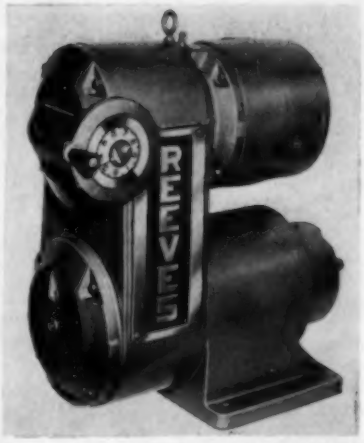
A self-contained portable pump designed for wide application is being manufactured by Schramm, Inc., 900 E. Virginia Ave., West Chester, Pa. The pump body, strainer, and impeller are bronze-constructed, and are recommended for handling chemical solutions and inflammable liquids. No priming is required, and any liquid more than 1⅝ in deep can be picked up. Solids over ¾ in are blocked out by a strainer. The pump's speeds vary between 3,200 and 3,600 rpm, depending upon the head against which it is pumping and its supply of air pressure. The maker recommends the unit for removing sewage, sludge, chemicals, oil, sump water, and mine water.

Hydraulic Unit Lubricating

Hydraulically-operated equipment, e.g. continuous miners, can be equipped with automatic centralized lubrication by adding a Trabon Hydra-Lube pump through a simple Trabon feeder system and reservoir, according to the Trabon Engineering Corp., 28815 Aurora Rd., Solon, Ohio. No special valves or drives are needed for installation, the company says, since the pump connects with existing hydraulic supply lines.

Drive's Efficiency Improved

New Reeves Vari-Speed Motodrives made by the Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio, have been designed with improved operating efficiency and extended ratios of speed variation, according to the company. The units are available in ratings up to 5 hp, and are generally the same in design as the Reeves fractional horsepower Motodrive size 100. The Motodrive is described by the manufacturer as "a versatile tool of automation, especially when used with automatic control systems."



Reducer Line Supplemented

Four speed reducers designed with 5:1 ratios have been added to the Shaft-King line of reducers manufactured by the American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa. The new reducers provide a speed

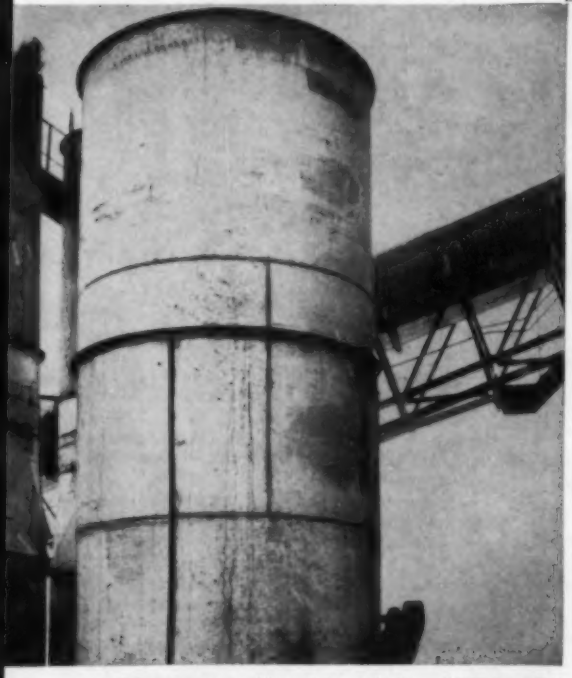
SEE US AT THE SHOW
Booth 1010
One sweep*
SAVED ITS COST...
Cleaning up several miles of track, once over, paid for original cost of machine. (Name on request.) Hydraulic controls of digger plate and side plows expedite a thorough cleaning job in one pass. Mine inspectors insist on clean haulage roads. Hazards of unsure footing and accumulation of explosive dust are minimized by cleaning the haulage ways with the "Canton" Custom-made to specifications. In use . . . coal, iron, copper, potash, lead and salt mines, also smelter skim tracks.
Half Century of Dependable Service
Other self-liquidating equipment . . . Mechanical or Air-operated Mine Doors, Air or Manual-operated Car Transfers, Electric or Air-operated Track Switch Throwers, Wet or Dry Rock Dusters, Cable Splicers, Cable Vulcanizers. Write for full descriptive brochures.
American Mine Door Co.
2037 DUEBER AVENUE
CANTON 6, OHIO

Stainless Steel screen outlasts carbon steel 4 to 1

and it's <u>still</u> going strong

AT BATON COAL COMPANY
RACHEL, W. VA.

▲Stainless Steel screen after one year of service. Previous carbon steel screen lasted only four months.



Exhaust gas scrubber. It is made from 3/16" type 304 Stainless.

The big picture shows a Hendrick screen made from type 304 Stainless Steel. It receives about 1,500 tons of coal per day for sizing. The screen replaces a carbon steel screen of identical dimensions. The carbon steel screen *blinded* in just three months; that is, the holes closed with rust caused by the corrosion and accumulated waste materials.

The Stainless Steel screen, after a *year* of operation, is still in excellent condition, and will undoubtedly serve for a long time to come. It has already handled 500,000 tons.

Stainless Steel is extensively used at this mine as liner material for chutes and sluices. It replaces carbon steel, which, in many cases, has corroded through completely. Another interesting application of Stainless is in the exhaust gas scrubber. The columns are nine feet in diameter and 21 feet tall. They are completely built from type 304 Stainless, which, in the words of the chief engineer, is the only material that could handle the severe corrosion and abrasion involved.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS

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UNITED STATES STEEL

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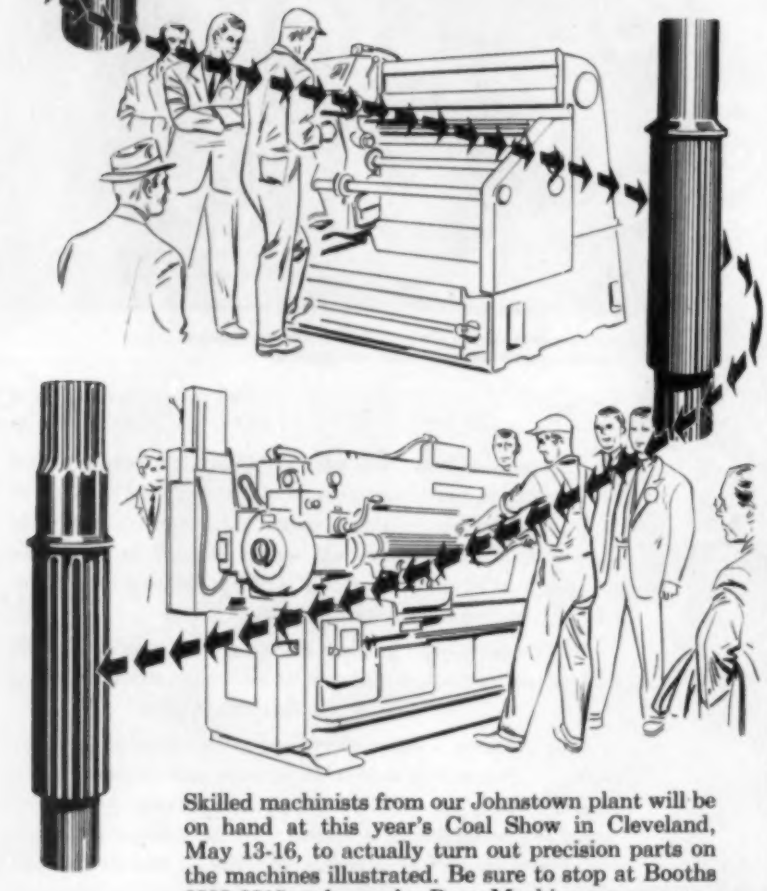
these precise and intricate
MACHINING OPERATIONS
performed on these machines
at the **COAL SHOW**

Booths No. 2809-2815

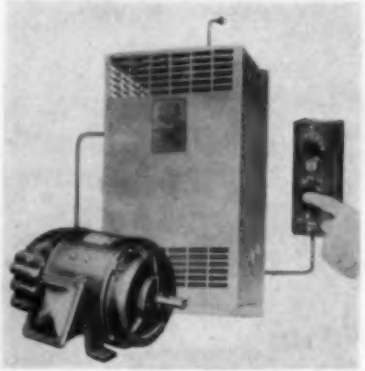


Skilled machinists from our Johnstown plant will be on hand at this year's Coal Show in Cleveland, May 13-16, to actually turn out precision parts on the machines illustrated. Be sure to stop at Booths 2809-2815 and see why Penn Machine gears, sprockets, shafts, bronze castings and specially designed parts set the standard for quality and accuracy in the coal industry.

PENN MACHINE COMPANY
JOHNSTOWN, PENNSYLVANIA

Union Trust Bldg., Pittsburgh, Pa. Mt. Hope, W. Va. Huntington, W. Va.

range from 60 rpm to 350 rpm when used in conjunction with fixed- or adjustable-speed wedgebelt drives. American Pulley says the reducers will accept loads up to 25 hp. Other features are those already a part of the Shaft-King line, i.e. no special mounting stand is needed; initial costs are low; an internally-ribbed cast iron housing provides permanent gear and bearing alignment.



Drive Horsepower Boosted

One of the results of redesigning the Reliance V*S Jr. variable-speed electronic drive is an increase from 3 to 4 hp in maximum size. The drive, manufactured by the Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17 Ohio., consists of a rectified power control panel, an operator's station, and a variable speed drive motor. The V*S Jr. is made in 220-v and 440-v models, and in sizes from ¾ through 4 hp. It will operate at 23 rpm for intermittent set-up duty, or up to 2,300 rpm for high speed production.

Air Motor Shaft Sinker

Le Roi Div., Westinghouse Air Brake Co., is marketing a shaft sinker designed with air motor feeds and air motor-controlled booms. Buyers are given a choice of two, three, four, and six booms plus six different drills. Designated the SDR, the shaft sinker is being manufactured by the division's Cleveland

REDUCE THE MOISTURE CONTENT of Your Coal

from 35%

to 7%

to 6%

to 5%

Yes, even less

Remarkable performance records over the years prove that C.M.I. continuous centrifugal dryers cannot be beat.

C.M.I. Dryers not only reduce surface moisture content from 35% to *less than 5%*, but also will do a fine job in recovering coal from slurry.

Yes, C.M.I. Coal Dryers and efficient coal mining operations go together. Our engineers are available to render prompt service, whenever and wherever needed.

Write, wire or phone for complete details. No obligation.

with C·M·I CONTINUOUS CENTRIFUGAL coal dryers

C·M·I Centrifugal DRYERS

CENTRIFUGAL & MECHANICAL INDUSTRIES, INC.

146 PRESIDENT STREET • SAINT LOUIS 18, MISSOURI

RUGGED
all the way thru!

Designed to fit your present resistor space

P-G STEEL GRID RESISTORS
consistently prove their value in
MINING SERVICE

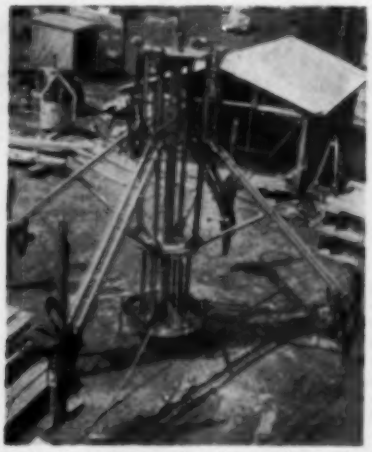
- Steel Construction
- Mica Insulation
- Corrosion Resistant
- Vibration Proof
- Moisture Resistant
- Provision for Expansion
- Adequate Ventilation
- Rugged Terminals

By use of those durable raw materials . . . steel and mica, and the P-G exclusive features of design, these steel grid resistors have the "built-in quality" to overcome factors which often cause resistor failures. Vibration, moisture laden or corrosive atmospheres have little effect on continuity of service. Try Post-Glover Resistors for heavy duty applications where resistors are subject to severe service . . . continuous "Trouble-Free" performance is assured.

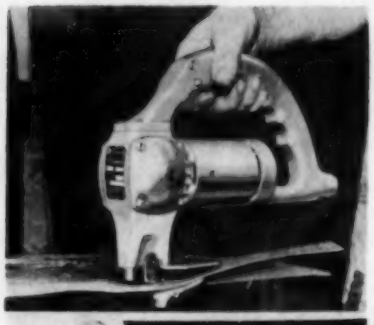
P-G The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY
• ESTABLISHED 1892 •
221 WEST THIRD STREET, CINCINNATI 2, OHIO

Equipment News (*Continued*)

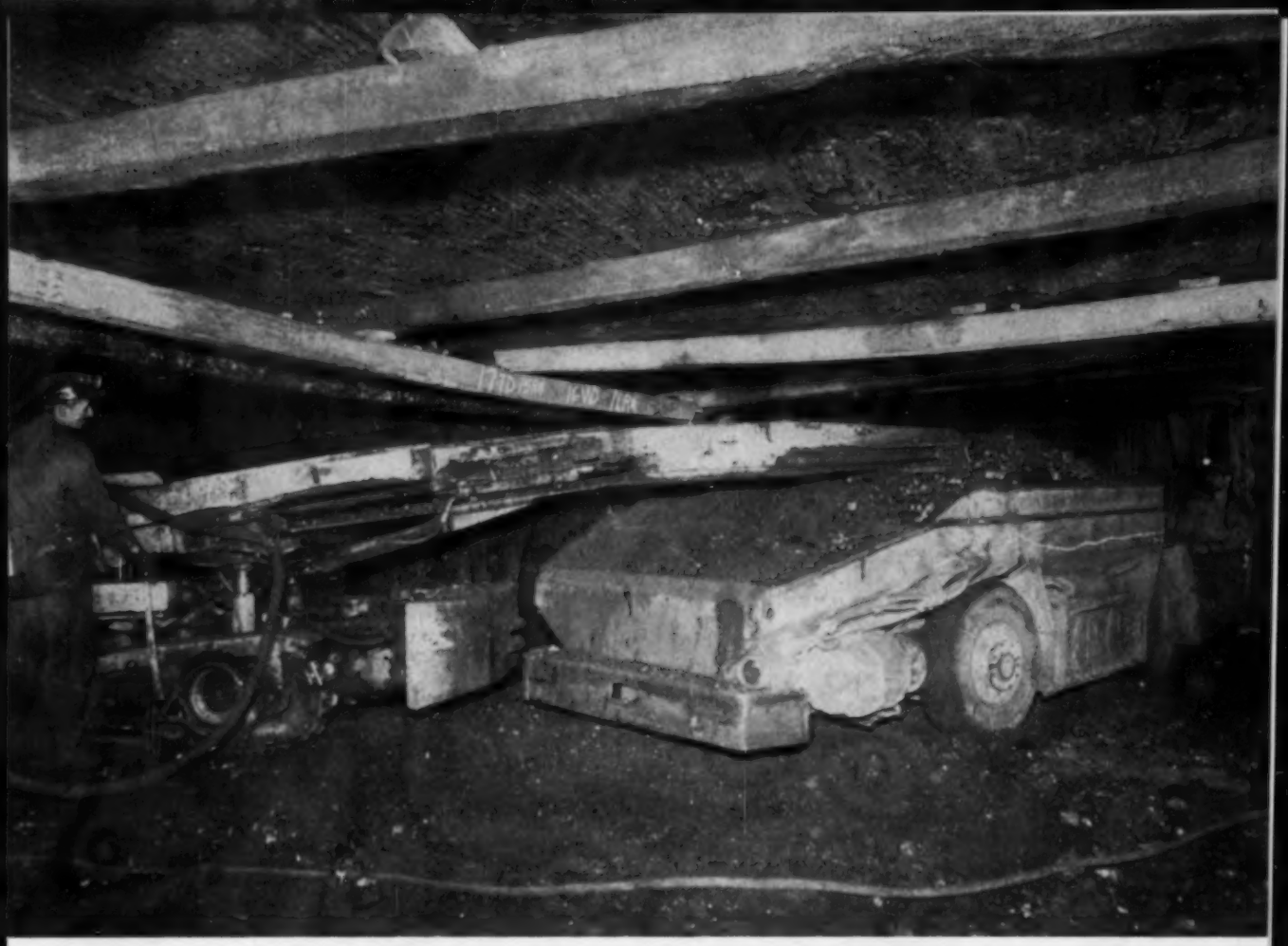


Rock Drill Plant, Cleveland, Ohio. The company points out that the main feature of the sinker is its rate of drilling, since faster and more accurate cutting is achieved over hand held tools. The sinker is equipped with a centralized oiling system and needs only one master air line from top-side down the shaft to he top of the shaft sinker. Air hoses to each drill are attached to the boom. Individual controls are situated on each boom-end and drill.



Metal Cutting Tools

Black & Decker Mfg. Co., Towson, Md., has added a No. 16 Nibbler to its power tool line. The machine punches out small, rectangular pieces in sheet metal, leaving a smooth edge without bending or curling the material. It operates on a punch and die principle, delivering approximately 3,300 strokes per min. Another new metal worker is the company's No. 16 shear, which reportedly makes fast, easy cuts in all types of sheet metal and wire netting.



Okocord Red Saddle shuttle car cable is the answer to:

constant flexing • run-overs • abrasion pulling • twisting

Conditions in individual mines vary. But you can be sure that you have a shuttle car cable that will resist all of these difficulties if yours is Okocord Red Saddle shuttle car cable (with Hex-Tite construction, of course).

The Red Saddle is a pre-formed neoprene protective wall which assures a uniformly thick fill between conductors . . . gives added security against short-circuiting during run-overs.

What's more, there's no danger of internal slipping or rotation with Hex-Tite construction. For the insulation of each conductor is hexagonally shaped to provide six plane surfaces which lock with the Red Saddle and Okoprene sheath. Bonding between all elements is assured by a special adhesive.

Naturally, the Okoprene sheath is tough, highly flexible and is unaffected by oils, acids, alkalies and mine water.

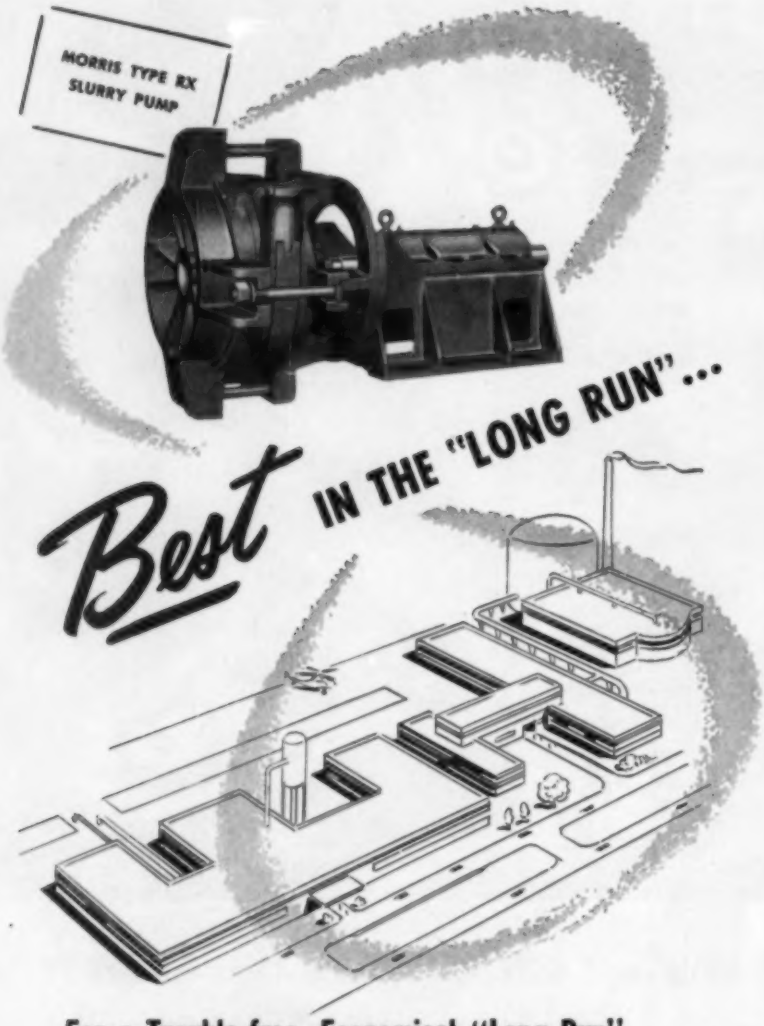
These features—plus others such as the heavy reinforcing cords embedded in both insulation and sheath as a further guard against pulling damage—are all good reasons why we believe Okocord Red Saddle, using the Hex-Tite construction, is your best buy in shuttle car cable.

You'll find complete information about this rugged construction in Bulletin CA-450. Write today for your copy to The Okonite Company, Passaic, N. J.

4774

Visit Okonite's display at Coal Show • Booth Number 1300

where there's electrical power... there's **OKONITE CABLE**



Best IN THE "LONG RUN"...

For a Trouble-free, Economical "Long Run"

SPECIFY MORRIS PUMPS...

● The Morris Pump operating right now will continue to function efficiently for many years to come. Long periods of testing have proved that.

Every pump built by Morris Machine Works is extremely rugged, dependable, trouble-free; operates with minimum attention . . . cuts maintenance costs . . . can be quickly dismantled for inspection, avoiding lengthy and expensive lay-up time.

Exacting engineering and design at Morris results in pumps that are *really* better in the long run; that give peak performance for both present and future needs.

● **FREE SERVICE** Morris engineers will gladly recommend the pump best suited to your size, capacity and specifications. Send necessary data today.

MORRIS
CENTRIFUGAL
PUMPS

Sales Offices in Principal Cities

MORRIS MACHINE WORKS · BALDWINSVILLE, N. Y.

The shear, says B&D, will cut through cold rolled steel at speeds up to 90 ft per min.

Portable Radio-telephone

A portable AM radiotelephone designed for field communications is being produced by the Kaar Engineering Corp., Box 1320, Palo Alto, Cal. The company calls the unit the TR 246 Packset. Output power is 2 w in the 2 to 8 Mc frequency range. Three 1.5-v "A" batteries, three 4.5-v "B" batteries, and two 7.5-v "C" batteries provide current. Special features: a built-in metering device; a receiver noise limiter, and a squelch system. The Packset weighs 23 lb, and is equipped with a telescoping 16-ft antenna.

Equipment Shorts

PUMP CASINGS—Allis-Chalmer's line of West Allis centrifugal pumps is being made now with nodular iron casings, the manufacturer announces. Nodular iron is recommended by Allis-Chalmers where pump casings are likely to be subjected to very high suction pressures as well as corrosive and abrasive materials. Developed and patented by A-C, nodular iron reportedly has considerably more strength and toughness than cast iron.

DUST COLLECTOR—Research-Cotrell, Inc., Bound Brook, N. J., has added the Aerodyne dust collector to its regular line. The design of the collector is said to permit maximum efficiency regardless of the size of an installation or the volume of gas handled.

ANTI-RUST PAINT—Chem Industrial Co., Brooklyn 9, Ohio, is making the "88 Special," an anti-rust paint that can be applied to dry or damp surfaces. The maker recommends the paint for wet weather applications.

LUBRICATION FITTING—A relief type lubrication fitting with a "flip-open"

Let PURE show you how...

IMPROVED LUBRICATION CUTS PRODUCTION COSTS

Pure Oil Field Industrial Engineers are at your service to help you SIMPLIFY and SAVE with PURE Industrial Lubricants

BE SURE

TO VISIT BOOTH 325 AT THE COAL SHOW—AND GET ALL THE DETAILS!

The Pure Oil Company

620 E. Broad St., Columbus, Ohio

Be sure with PURE

Equipment News (*Continued*)

cap that speeds bearing lubrication is being made by the Keystone Lubricating Co., 3100 No. 21 St., Philadelphia 32, Pa. The fitting is named the Keystone RT and is designed to permit free discharge of excess grease.

DIESEL POWER UNIT—International Harvester's Construction Equipment Div. has announced the UD-281, a four-cylinder, 60-hp diesel power unit as a replacement for the earlier UD-264.

SAFETY SHOE—The Flat-Tred Wedgie, a safety shoe introduced by Hy-Test Safety Shoes Div., International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo., is built with a "Resist-Oil" sole and wedge heel. Both sole and heel are cellular grit crepe. The upper leather is processed with DuPont Quilon to resist water. Additional features: steel box toe, storm welt, and leather laces.

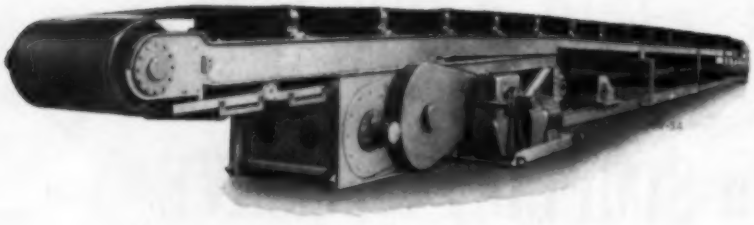
AC RELAY—A new SC sensitive relay with transistor amplifier is being made by Cutler-Hammer, Inc. The unit is designed to resist vibration, corrosion, and shock. Features: a two-pole, double-throw plug-in relay protected by a polystyrene cover; a 12-v, DC sensing circuit; and a low sensing circuit current of less than .002 amp. Rated up to 10 amp, 110 v, 60 cycles, the relay requires no warmup time.

MOTOR GENERATOR WELDERS—General Electric's new line of motor-generators, the WD30AE and the WD-40AE, are made with pre-lubricated, sealed bearings, and controlled current peaks. In addition, an improved magnetic starter is designed to prevent motor burnout in the even of overload.

FAST DRYING ENAMEL—BoGard Rapid Dry, produced by Body Bros., Inc., Bedford, Ohio, is said to possess the durability of enamel and drying speed of lacquer. Drying is completed in 15 to 20 min, and the maker recommends the enamel for use in field shops or where excessive dust exists.

For fast main-line haulage,

JEFFREY 80-A BELT CONVEYORS



Record tonnages at the mine face demand that coal be hauled away fast, or production will bog down. Jeffrey offers a solution, the 80-A Belt Conveyor.

Its husky head was designed especially for rapid, heavy haulage... built for drives up to 160 HP and belt speeds up to 600 FPM. It has tandem drive for maximum contact with drive pulleys, and a pneumatic takeup for proper slack tension on the belt.

The 80-A frame is adaptable to 30, 36 and 42-inch conveyor belts and permits a choice of various standard Jeffrey idlers. Let us quote on your requirements. The Jeffrey Manufacturing Company, 912 North Fourth Street, Columbus 16, Ohio.

JEFFREY

MINING • CONVEYING • PROCESSING EQUIPMENT... TRANSMISSION MACHINERY... CONTRACT MANUFACTURING

Free Bulletins

POWER UNITS—"International Power Units Make Your Most Profitable Power Partners" is the title of Booklet CR-513-G, published by the International Harvester Co. to distribute information on the company's 16 power units. Construction Equipment Div., 180 N. Michigan Ave., Chicago 1, Ill.

FUEL INJECTION—How mar parts are in the Cummins PT fuel system? Is fuel metered in the pump or in each individual injector? These are samples of the questions Cummins Engine Co. asks and answers in a booklet titled "Cummins PT Fuel Injection System." Illustrations include cutaway views of the four PT fuel pump assemblies as well as the PT injector. The PT system is adaptable to all Cummins diesels built since 1932. 1138 Fifth St., Columbus, Ohio.

DRYERS—Multi-Louvre dryers and how they work are the topics of Link-Belt's Book 2609, available from Dept. PR, Prudential Plaza, Chicago 1, Ill. The writers have included such information a# drying, cooling and bulk materials processing. Typical layouts, dimensional data and charts are included in the step-by-step description.

WELDING—Simplified automatic and semi-automatic welding details can be found in "Controlled Arc Power Supply" published by the Metal & Thermit Corp., Rahway, N. J. How arc length is controlled and the major benefits of constant voltage are explained.

ASBESTOS-CEMENT PIPE — A four page brochure tells all on asbestos-cement building sewer pipe made by Keasbey & Mattison Co., Ambler, Pa. Quick-assembly procedure of the pipe and coupling are outlined.

BEARING METAL — Babbitt metals made by the Glyco process are said to be superior to tin alloys, to cost less, and last longer, according to Bulletin

BLAST HOLE

ALL AIR ROTARY DRILL

6" Six Inch to 9" Nine Inch BLAST HOLES

KEYSTONE FRANKS-40

with 30,000 PULL DOWN CAPACITY

UP TO 7¼" BLAST HOLES

AIR COMPRESSOR RUNNING AT 870 RPM

Gardner-Denver Model—WAH 7½x5 or equal—six cylinder water cooled compressor. Piston displacement 667 cubic feet per minute free air. Displacement of 533 cubic feet at 20 PSI, 500 cubic feet per minute at 30 PSI, and 467 cubic feet per minute at 40 PSI. Top continuous operating pressure is 100 PSI yielding 295 CFM of air.

9" BLAST HOLES

AIR COMPRESSOR RUNNING AT 870 RPM

Gardner-Denver Model WAJ 8½x6 or equal—six cylinder water cooled compressor. Piston displacement of 1,029 cubic feet per minute free air. Displacement of 835 CFM at 20 PSI, and 95 horsepower.

[redacted]

BIG HUSKY HEAVY DUTY DRILL MANUFACTURED BY 75 YEAR-OLD PRODUCER THAT BUILT OVER 2,500 CABLE TOOL BLAST HOLE RIGS AND IS NOW PRODUCING THE MOST RUGGED, TRUCK-MOUNTED, BLAST HOLE AIR ROTARY THAT DRILLS FASTER FOR LESS COST

KEYSTONE-FRANKS—MODEL 40 on 6-WHEEL DRIVE TRUCK

NOTE: 30,500 pound capacity hydraulic jack at engine end of Model 40 Machine.

FRONT VIEW KEYSTONE-FRANKS MODEL 40

TELEPHONE: 69 BEAVER FALLS, PENNA.

manufactured by

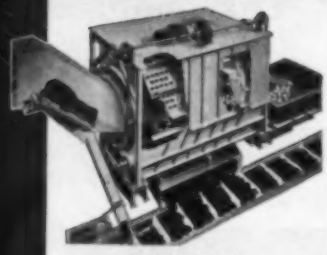
STARDRILL-KEYSTONE

BEAVER FALLS, PA.

Since 1882 Stardrill-Keystone COMPANY

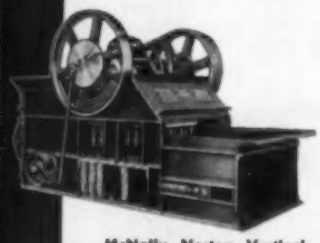
DRILLING MACHINE Manufacturers SINCE 1882 • Our 75th YEAR

America's most complete line of CRUSHING EQUIPMENT



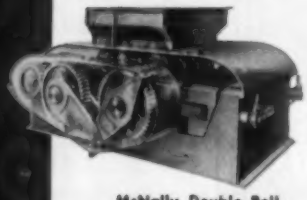
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.

McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News (*Continued*)

5, a publication of Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 8, Ill. Other advantages reported in the bulletin: finer grain structure for reduced friction and greater strength at higher operating temperatures.

HARD-FACING WIRES – Stoody Co., Whittier, Cal., is distributing a folder describing hard-facing wires for semi-automatic applications. The folder contains data on welding characteristics, plus suggested uses of the 11 wires listed.

PORTABLE HOISTS – A 12-p booklet published by the Joy Mfg. Co., Oliver Bldg., Pittsbugh 22, Pa., is designed to aid in selecting single-drum portable multi-purpose hoists. Listed are descriptions and specifications for air, electric and gasoline models, ranging in size from 0.9 hp to 15 hp. Lifting capacities are from 750 to 5,000 lb.

CONSTRUCTION EQUIPMENT – A number of endorsements of International Harvester's construction equipment line are used in Folder CR-526-G to document International's statement "you can cut costs and increase production with modern International equipment for mining." Address: 180 No. Michigan Ave., Chicago 1, Ill.

BRONZE VALVES—Solder end and silver-braze end bronze valves in gate, globe and check designs are illustrated with text and photos in Bulletin DH-25, a publication of the R-P&C Valve Div., American Chain & Cable Co., Inc., Reading, Pa. Applications are given.

LABORATORY COAL CRUSHERS—"Better Testing and Small Scale Reductions," Bulletin 157, offers readers a look at American Pulverizer's laboratory crushers for preparing coal samples. The units are made in capacities from 600 to 2,000 lb per hr. Several types of sampling discharge hoppers and rifle splitters are illustrated. The American Pulverizer Co., 1249 Macklind Ave., St. Louis 10, Mo.

PERFORATED METALS – "Wissco" perforated metals for ornamental and industrial purposes are the subject of a folder available from the Wickwire Spencer Steel Div., the Colorado Fuel & Iron Corp., 575 Madison Ave., New York, N.Y. The folder contains ordering specifications for the metals, which are made in various patterns including cane, lattic, slat and standard round perforations.

LOCOMOTIVE PARTS SERVICE – A 12-p illustrated booklet, GEA-6534, outlines nine reasons why General Electric parts service can reduce railroad maintenance costs and increase operating efficiency. A map shows five regional railroad parts centers. General Electric Co., Schenectady 5, N. Y.

MOTOR GRADER – The working advantages of the Allis-Chalmers Model 45 motor grader are covered in a 16-p catalog, MS-1148, published by Allis Chalmers Mfg. Co., Construction Machinery Div., Milwaukee, Wis. Brief descriptions of attachments and accessories are included.

DRILLING EQUIPMENT – Mobile Drilling, Inc., Dept. 19, 960 No. Pennsylvania St., Indianapolis 4, Ind., has combined all its descriptive literature in a catalog packet. Within the catalog packet is information on augers, core barrels, drilling heads, bits, winches, couplings, rotary rigs, as well as information on Mobile's soil and foundation engineering service.

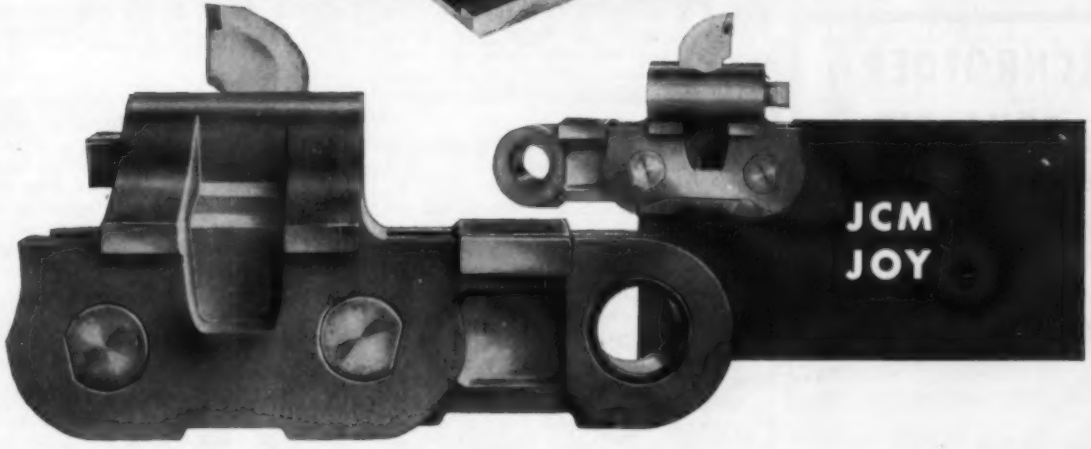
BELT MAINTENANCE – The selection, installation, and a number of tips for maintaining V-belts have been covered in a new booklet published by Allis-Chalmer Mfg. Co., Texrope Drive Dept., Milwaukee 1, Wis. The eight most common causes of V-belt destruction are listed.

HYDRAULIC STARTER—The improved General Motors "Hydrostarter" is the subject of a new brochure being distributed by the company from its Detroit Diesel Engine Div., 13400 W. Outer Drive, Detroit 28, Mich.

HOSE AND FITTINGS—Bulletin No. 182, published by the Aeroquip Corp., Jackson, Mich., contains lists of hose, fittings, socketless kits, and self-sealing couplings. The bulletin was prepared for use in ordering Aeroquip parts, and contains information on the company's standard industrial products. In addition, there are notes on installation planning, assembly instruction, and how to order.

STEEL BUILDINGS—A new manual printed by Armco explains the Steelox panel method of construction. Some of

PROX sets a NEW HIGH STANDARD FOR PRODUCTION in a complete line of proven equipment for continuous miners



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Faster, Safer
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COAL DRILL

MODEL 12-B

Safe, dependable, fast drilling with complete safety . . . no spark, no kick . . . all electrical hazards removed yards from drill. Light weight Model 12-B is powered from hydraulic systems of standard mining equipment or can be furnished with Schroeder Tricycle Hydraulic Mobile Power Unit. Features minimum of operating parts and reduced maintenance costs.

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BH DRILL BIT

For hydraulic hand-held coal drills, assures faster drilling with less effort as a result of . . .

BH-1 BIT

1. Reduced area of penetration for ease of feed.
2. Greater clearances reduce drag.
3. Heat treated forged steel bit body.
4. Tough carbide tips hold cutting edge longer.

Send today for details and prices.

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McKEES ROCKS, PA. SPaulding 1-4810
HYDRAULIC, ELECTRIC & PNEUMATIC EQUIPMENT

Equipment News (*Continued*)

the buildings described are frameless, rigid frame, shed roof, and utility. Product Information Service, Armco Drainage & Metal Products, Inc., Middletown, Ohio. (Manual SX-14456)

BELT DRIVE DATA—A112-p Engineering Data Book prepared by the Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N. J., contains comprehensive data on V-belt drives. A number of charts, tables, and diagrams, in addition to specifications for all drive sizes, are designed to aid selection.

BATTERY BUYING—A booklet aimed at helping industrial battery buyers select the most economical and efficient batteries for particular functions has been prepared by Gould-National Batteries, Inc., Trenton, N. J. "So You're Going to Buy an Industrial Battery" outlines the significance of battery design, and offers a four-point program for battery users for selecting the right battery. Tips for achieving maximum life and performance are included.

SPEED REDUCERS — Falk Corp.'s Bulletin 1105 combines information on concentric shaft and right-angle speed reducers for applications up to 140 hp. Horsepower and torque ratings are given, plus dimensions, overhung load and thrust capacities. Offered in a range of ratios between 1.49:1 and 1459:1. Falk Corp., 3001 West Canal St., Milwaukee 1, Wis.

CHISELS— Pneumatic and hand chisels, plus related products such as chisel blanks, are the subjects of a 16-p catalog being distributed by the Bedford Tool & Forge Co., Bedford, Ohio. Text includes pneumatic chisel point styles, scaler chisels and point styles, and chisel shank styles. In addition the company's tool reconditioning service is explained.

MOTORS AND DRIVES—Bulletin A-2501 published by the Reliance Electric & Engineering Co., Cleveland 17, Ohio, points out the features of the company's totally protected motors, industrial DC motors, Reeves drives, variable speed drives, motor controls, and generator sets.

AUTOMATION SYSTEM — A bulletin published by Research-Cottrell Inc., Bound Brook, N. J., describes the Cottrell automation system, which brings automation to the power inputs of electrostatic precipitators, eliminating manual adjustments and increasing round-the-clock dust and fume collection efficiencies. The bulletin defines "Ideal Electric Power," and demonstrates how precipitator power level, which is required for optimum performance, can be more closely approached by automation than by manual control.

CONVEYING SYSTEM — Joy Mfg. Co.'s "Ready-Span" conveying system for above ground bulk handling is explained in Bulletin LD-106. Defined are Ready Span sections of pipe-truss frame, drive assembly, tail frames intermediate sections and supports, takeups, belt feeders, idlers, belt selection, horsepower selection, and belt conveyor capacity. The bulletin's centerfold contains a complete diagram of the conveyor. Oliver Bldg., Pittsburgh 22, Pa.

COUPLINGS—Descriptive Bulletin 270, published by Snap-Tite, Inc., Union City, Pa., explains the new quick-connect, quick-disconnect "HK" coupling. The coupling, constructed with Teflon seals, handles acids, alkalies, and high pressure steam. It is designed to function between −100 deg and 500 deg.

HOSE CLAMPS—"Interesting," a folder published by the Punch-Lok Co., on the triple-locking feature of "interesting" hose clamps, is being distributed from the company's office at 312 No. Justine St., Chicago 7, Ill. Included is information on the Model P-38 Clamp-Master, and the Model P-1 Loking Tool.

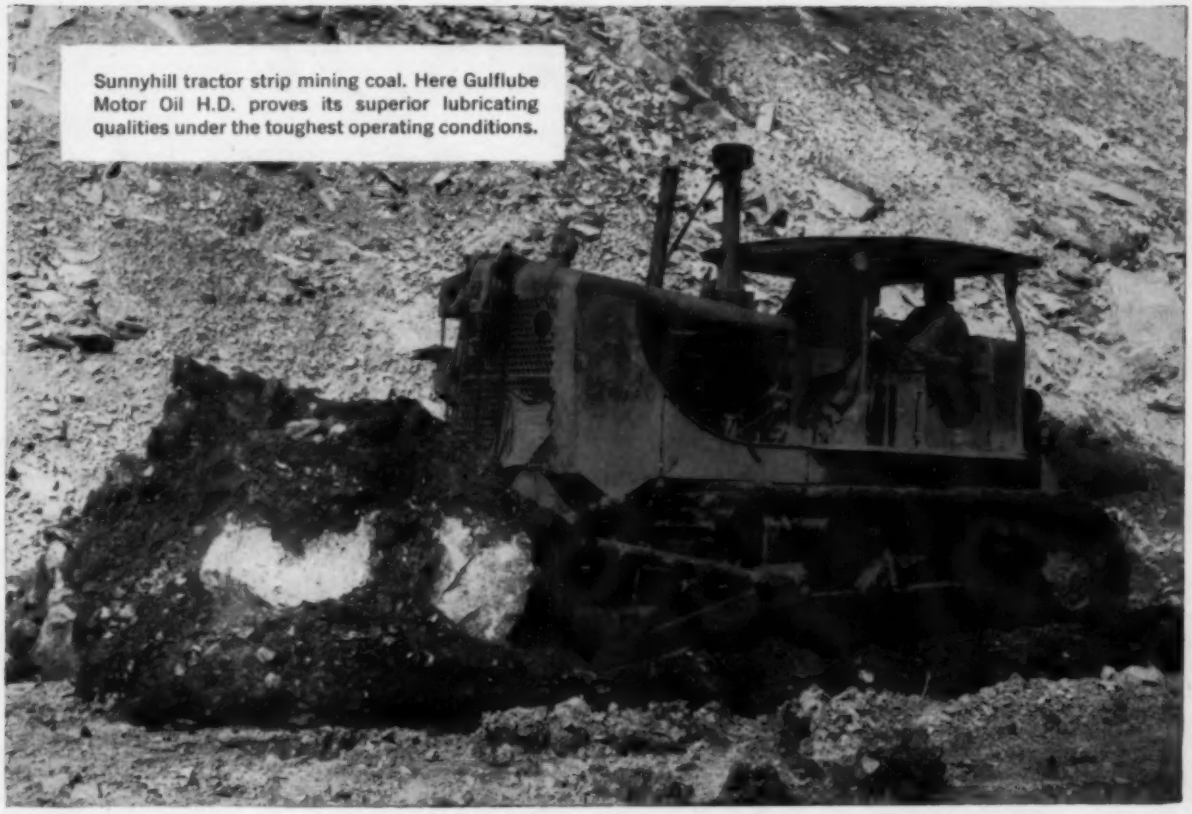
DIESEL BATTERIES—Text, photos and diagrams are used in Bulletin GB-1078B by Gould-National Batteries, Inc., Trenton 7, N. J., to point out the features of the company's Kathanode diesel locomotive starting battery. Construction details are included, as are specifications with ampere hour capacities, unit dimensions and battery weights.

CARBON MONOXIDE ANALYZERS—How the Mine Safety Appliance Co.'s carbon monoxide analyzer works is explained in Bulletin 0702-1. In addition, the bulletin points out the menace of accumulated carbon monoxide. M-S-A says in the folder that its analyzers are adaptable to any set of individual requirements. Address: 201 No. Braddock Ave., Pittsburgh 8, Pa.

THERMAL DRYERS — Bulletin 756, prepared by McNally Pittsburg Mfg. Corp., Pittsburg, Kans., contains technical data on a number of types of thermal dryers. Included is a complete description with gas flow diagrams, dimension drawings, installation drawings of the McNally Vissac, McNally Pulso, and Cascade dryers.

CARBIDE GRADES — A series of 15 Blue Data Sheets prepared on carbide grades has been prepared by the Allegheny Ludlum Steel Corp., Carmet Div., 1500 Jarvis Ave., Detroit 20, Mich. Colors are used in the sheets to show each grade's function. A red band, for example, indicates machining steel grade; blue, a non-ferrous and cast iron materials grade. Each of the data sheets gives typical applications, analysis, physical characteristics, and a photomicrograph showing the grain structure of the carbide powder.

INDUSTRIAL TRUCK BATTERY — The new Gould "Thirty" industrial truck battery, developed for the sustained power requirements of industrial elec-



Sunnyhill tractor strip mining coal. Here Gulflube Motor Oil H.D. proves its superior lubricating qualities under the toughest operating conditions.

Another tribute to

GULFLUBE MOTOR OIL H.D....

"I have never seen any engine—after 5,000 hours—in cleaner condition!"

As part of their regular maintenance program, Sunnyhill Coal Company, New Lexington, Ohio, recently had one of their tractors overhauled by factory-trained mechanics. This is the letter they received from the Central Ohio Tractor Company of Columbus . . .

"My sincere compliments to you and your men for having done an excellent job of engine maintenance. I can truthfully say that I have never seen any engine with 5,000 hours in cleaner condition. The crankshaft showed not the slightest evidence of dirt. All bearings were like new. The filters were clean.

"We here at Central are proud and happy to have owners, such as your company, who take pride in their equipment and are aware of the importance of 'preventive maintenance.'"

Gulflube Motor Oil H.D. was the only oil used in this engine during the entire 5,000 hours of operation. Here's impressive proof that Gulflube's tough lubricating film *does* protect against excessive wear—that its high detergency *keeps* rings clean and free.

Find out how Gulflube Motor Oil H.D. can help reduce *your* maintenance costs. Call in a Gulf Sales Engineer. Contact him at your nearest Gulf office.

GULF OIL CORPORATION
1822 Gulf Building
Pittsburgh 30, Pa.

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THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

HERE IS A NEW

LARGE SIZE WIRE

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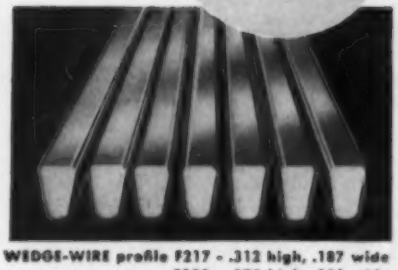

WEDGE-WIRE profile F217 - .312 high, .187 wide
F250 - .375 high, .191 wide

Especially designed for extended life in abrasive applications. Possesses the necessary construction features to easily maintain openings from ½ inch to as close as 1 m.m. Available in many metals. Furnished in guard bars and special shapes or designs. Adaptable to vibrator applications.

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*INDEPENDENT FLEXING ACTION—Unique construction permits individual wires to "flex" independently for greater screening capacities and abilities while maintaining "rigid" requirements.

write for prices and details

WEDGE-WIRE CORPORATION
Wellington, Ohio

Equipment News (*Continued*)

trical trucks, is described in Bulletin GB1567B. Full details of battery construction are included. Gould-National Batteries, Inc., Trenton 7, N. J.

CONVEYOR BELTS — New style designations of general service, heavy duty conveyor belts made with special strength members are covered in Catalog 25 CB, published by the manufacturer, Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.

REAR DUMPS—Euclid Div., General Motors, Cleveland 17, Ohio, is distributing literature on four new rear-dump models now in production. The bulletins' subjects are the Model S-7, an overhung engine type tractor with semi-trailer of 12-ton payload; the Model S-18, another semi-trailer with a payload of 35 tons and a heaped capacity of 32 yd; the Model R-18, a conventional type hauler with an 18-ton capacity; and the Model R-40, a tandem-axle machine powered by two engines and a capacity of 40 tons.

DRAGLINE BUCKET—Catalog A57, published by the Page Engineering Co., Clearing Post Office, Chicago 38, Ill., is an 8-p explanation of the company's A Series automatic dragline buckets that handle ⅛ to 3 cu yd. The answers to "What Makes a Dragline Bucket Dig" and "The Automatic's Exclusive Digging Action, How It Works" are given in separate sections.

INDUSTRIAL LOCOMOTIVES—"Why Electric Drive is Best for Industrial Locomotives" is the title of a General Electric bulletin. The "advantages of electric drive over mechanical or hydraulic transmission" are listed.

POWER UNITS—Detroit Diesel Engine Div., General Motors, has issued a 19-p catalog outlining the company's complete line of power units for all types of industrial applications. Specifications for 31 engine models from 44 to 761 brake horsepower are included. Detroit Diesel, GM Corp., Detroit 28, Mich.

GENERATING PLANTS—How 28 Onan electric generating plants supply power is told in "Power Points Digest," a publication of D. W. Onan & Sons, Inc., Minneapolis, 14, Minn.

SCRAPERS—Three new Euclid scrapers are described in literature being distributed by the Euclid Div., General Motors Corp. Models SS-18 and SS-24 are four-wheel tractor type scrapers with struck capacities of 18 and 24 yd. Each has a 300-hp engine and Torqmatic drive. The Model TS-24 is an over-hung engine type twin power scraper with a capacity of 24 yds struck, 32 yds heaped. Two 300-hp engines power it.

WELDING ELECTRODES—A 20-p manual on Rexare hard-facing and manganese electrodes is available from the Sight Feed Generator Co., West Alexandria, Ohio. Typical buildup and hard-facing applications are illustrated and recommended application procedures are described.

ENGINE RATING CHART — International Harvester has announced a rating chart for its line of 17 engines and and power units. The chart shows brake horsepower on engines without fan or accessories, and on power units with fan and accessories. Ratings also are given on all fuels which can be used in the carbureted units. Ask for CR-522-C, International Harvester Co., Construction Equipment Div., 180 No. Michigan Ave., Chicago 1, Ill.

WIRE ROPE SLINGS—Uniflex slings, Multiflex slings, and Maxiflex slings, all products of the Wickwire Spencer Steel Div., the Colorado Fuel & Iron Corp., are explained and illustrated in three bulletins being distributed by the company from its office at 575 Madison Ave., New York, N. Y. Uniflex springs are designed for applications where abrasion is a factor; Multiflex for maximum load-bearing surface area and flexibility in one direction; Maxiflex for flexibility in all directions.

LUBRICATION FITTING—Keystone Lubricating Co., 3100 No. 21 St., Philadelphia 32, Pa., has announced Bulletin BU-61, which covers a special relief-type lubrication fitting. The fitting is said to save time and prevent over-lubrication of ball and roller bearings.

ROLLER CHAIN—Link-Belt Co.'s LXS bushed roller chain is presented in Book 2454 by the company to point out the chain's features of extra strength, increased wear resistance, and wider application flexibility. The chains are manufactured in two designs—straight or offset sidebars—and are supplied with small or larger rollers to cover a wide variety of power transmission or conveyor applications. Prudential Plaza, Chicago 1, Ill.

SHAPE CUTTING MACHINES—The advantages and applications of the Airco No. 4 Monograph portable shape cutting machine are outlined in Catalog 804E, a publication on Air Reduction Sales Co., Inc., 150 E. 42nd St., New York 17.

HEATING DEVICES—Information on such new products as cartridge heaters, miniature soldering irons, and aluminized steel sheath strip heaters is part of a 72-p catalog being distributed by the General Electric Co., Schenectady 5, N. Y. Designated Bulletin GEC-1005H, the publication also includes data on immersion, strip, tubular, finned tubular, and railroad switch heaters; unit heaters, soft metal melting pots, oven equipment, and control heating.

Fill out your technical library by writing directly to the manufacturers for free publications.

Everytime a "95" Payhauler® leaves this shovel,

Camp Co. gets an extra 5 yds!

Day-to-day operational studies at Camp Concrete Rock Co., Brooksville, Fla., prove it! *Two International "95" Payhauler trucks, working with other haul units in the same capacity and power class, each carry an extra five yards every time they leave the 2½-yard shovel!* Loading time averages 2½ minutes for eight dippers or 20 yards. Haul length is approximately ¾ miles and includes a 10% adverse grade. The loaded Payhauler trucks travel this distance in 3 minutes, easily reaching load-carrying speeds of 34 mph. The empty return trip takes only 2 minutes, with the Payhauler trucks reaching top speeds of 38 mph.

Counting waiting, spotting time over the grizzly, and dumping time, the Payhauler trucks average a complete cycle approximately every ten minutes. During Camp Concrete Rock Co.'s nine hour day, *this means an impressive total bonus yardage of approximately 225 yards per day from each Payhauler*... an International-inspired saving of thousands of dollars yearly over Camp Co.'s other units.

You've probably read of similar outstanding International Payhauler successes in the rock, stone, and quarrying industries. Now try the amazing "95" and "65" Payhauler first hand. Test the safe and easy full-load maneuverability...the ample power of the 335 hp turbo-charged diesel engine in the "95," and 250 hp turbo-charged diesel engine in the "65." Check fuel consumption, too. See how you can bank *10%* savings, as well. Your International Construction Equipment Distributor will be glad to give you an eye-opening demonstration.

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors...Self-Propelled Scrapers ... Crawler and Rubber-Tired Loaders... Off-Highway Haulers .. Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Portable Cable: "It's the toughest, most flexible trailing cable we've ever used in our mines," says general superintendent of coal mining company.

AAAC, developed and introduced by Kaiser Aluminum! Gives greater strength in high conductivity and is stronger than All Aluminum Conductor.

Portable Cord that gives you three times longer life than the average of molded cords of other makes. It's *proved* by 12,000 tests over a 3-year period.

Control Cable, backed by 67 years of experience in electrical wire and cable manufacturing. That means dependability—*proved security* for public safety!

Service Entrance Cable, now UL-approved for 75° wet applications! Improved design characteristics include pleasing appearance and ease of application.

IF IT CARRIES CURRENT

KW CARRIES IT!

Now! Unsurpassed benefits for the mining industry due to Kaiser Aluminum's recent purchase of the Wire and Cable Division of U. S. Rubber, located at Bristol, Rhode Island!

Now from one source, you get all the established KW products plus all products of the new Bristol mill (formerly Wire and Cable Division of U.S. Rubber). For former U.S. Rubber products, the same quality insulations and product guarantee terms will be continued.

Now from one source, you get the most advanced technical assistance in the industry—the full cooperation of the research and development leaders of both aluminum and copper conductors.

Now from one source, better-than-ever service—from two plant locations (Newark, Ohio and Bristol, Rhode Island). This includes service from the production, engineering, sales and distributor organizations of both Kaiser Wire and the former Wire and Cable Division of U.S. Rubber.

For immediate attention to any request for electrical conductor products, engineering and research service, or further information, contact your nearest Kaiser Aluminum sales office or the KW distributor listed in your telephone directory.

Kaiser Aluminum & Chemical Sales, Inc., *Executive Office,* Kaiser Building, Oakland 12, California; *General Sales Office,* Palmolive Building, Chicago 11, Illinois.

WE'LL BE LOOKING FOR YOU AT BOOTH 2604 (LOWER LAKE SIDE HALL).

Kaiser Aluminum

the bright star of metals

See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

ACSR that can meet or exceed your toughest requirements. Put Kaiser Aluminum's growing leadership in extra high-voltage research to work for you today!

Triplex—combining three wires in one compact assembly—makes possible neater services, fewer attachments, easier installations—for big savings.

Power Cable that eliminated 26 competitive cables in time periods of from zero to 2,509 hours of a High Ozone Attack test—then went on to 6,000 hours.

Weatherproof—One of the nation's leaders in covered conductor, Kaiser Aluminum supplies the finest distribution, secondary and service cable in the field.

NEWS ROUND-UP

Coal, Oil, Atom Teamed To Fuel Diesel Engine

Finely ground coal irradiated with atomic energy and added to diesel oil is being burned successfully in diesel engines by the Denver & Rio Grande Western RR. Burning is taking place on a small scale at the Rio Grande's research laboratories in Denver.

The experiments are being made with a 5-hp Whitte diesel formerly used in a caboose to generate electricity. Full scale tests with locomotives are being arranged.

Ray McBrian, engineer in charge of research, reports that tests have proved it feasible to add 5% of low-cost coal to each gallon of diesel oil.

"Last year the Rio Grande burned some 40 million gallons of diesel oil" Mr. McBrian says. "An average price savings of just 1¢ a gal would mean an annual saving of $400,000 to our line alone."

If large scale tests are successful the system could mean revitalization of the west's coal industry, some observers believe.

"This idea of burning coal in a diesel," Mr. McBrian says, "is just one more unexpected development to pop up out of our atomic locomotive studies. The atomic energy in this case isn't used to run the diesel engine. Instead, it is used to break up fine grains of coal into such tiny particles that they burn up completely inside the cylinder.

"The coal first is crushed to 200 mesh. Then we send it to Brookhaven National Laboratory for irradiation with atomic energy. The sources of this irradiation are waste products from atomic reactors. Under the impact of the radiation—similar to radium and x-rays—the already fine grains of coal split up into particles measured in microns.

"A micron is 1/25,000 in. This coal dust floats in the air as smoke would. It mixes with the oil and increases its energy content when used as diesel fuel."

FOR EDITORIAL ACHIEVEMENT—*Coal Age* assistant editor W. A. Raleigh, Jr., accepts first place plaque, Class C, of the Jesse H. Neal awards during Washington session of the National Conference of Business Paper Editors April 17. The plaque is awarded to an "editor for the best account of an event, project, or subject of major significance to the field served." Mr. Raleigh won with the story, "U. S. Coal Props World Prosperity" (*Coal Age*, March, 1956).

Bituminous Output

YEAR TO DATE	PRODUCTION
April 13, 1957	144,130,000
April 14, 1956	149,095,000

1957 output 3.3% behind 1956.

A month earlier output was 5.2% below 1956.

WEEK ENDING	PRODUCTION
April 13, 1957	9,900,000
April 14, 1956	9,935,000

Anthracite Output

YEAR TO DATE	PRODUCTION
April 13, 1957	6,785,000
April 14, 1956	8,082,000

1957 output 16.0% behind 1956.

A month earlier 1957 output was 15.9% below 1956.

WEEK ENDING	PRODUCTION
April 13, 1957	498,000
April 14, 1956	545,000

Gas Regulation Bills Introduced In Congress

Reps. Oren Harris (D-Ark.) and Joseph O'Hara (R—Minn.) introduced identical bills to free gas producers from "utility" regulation and to provide a new price regulating method for gas sold to interstate gas pipeline companies.

Although a similar bill was vetoed last year by President Eisenhower, the new bill reportedly has presidental approval. The bill would divide pacts between producers and pipeline companies into two classes: 1) new producer contracts, or those entered into after enactment of the bill; and 2) existing producer contracts, or those contracts already in effect. Every new producer contract would have to be filed with the Federal Power Commission within 30 days after execution. If a price were found by the FPC to be higher than "reasonable market price" the contract would be declared void. If a contract called for an indefinite price the FPC could prevent it from exceeding the reasonable market price.

The bill declares that the reasonable market price "is not necessarily the price of the last sale, the highest price, the lowest, or other price arrived at by the application of a single criterion."

(*Continued*)

In This Section

Coal, Oil, Atom Teamed	186
Gas Bill Introduced	186
News Briefs	188
Preparation Facilities	188
Current Coal Patents	190
BCR Report	198
Foreign News	208
Personal Notes	222
Indiana Institute Meets	232
Among the Manufacturers	246

BOOTH 1813

1957 AMC COAL SHOW

CLEVELAND, OHIO
MAY 13-16

My name is J. H. Sanford, Manager of the Mining Division of the Ohio Brass Company.

I'd like to invite you to visit us at the O-B booth, where you'll find some of the most striking exhibits, some of the most interesting new product developments you've ever seen, including:

- A new O-B color film on roof bolting safety *(available through your O-B representative)*
- A new O-B Roof Support Expansion Unit
- A new O-B 3,000-amp Feeder Safety Switch
- A new O-B Cable Fault Locator
- A new O-B Mine Locomotive Current Collector
- A new O-B Hanger Installation Tester

I suggest you make sure that Booth 1813 (the same booth we've occupied in past years) is high on your list of "must see's" when you come to Cleveland May 13-16!

See your April Haulage Ways for a full preview of these new O-B developments!

Ohio Brass

MANSFIELD OHIO • U.S.A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

4009-M

"Instead it is a price which the Commission, exercising its judgment and discretion in weighing all factors, determines the reasonable market price."

News Briefs

Rising oil prices and limited gas supplies have been cited as reasons for burning coal in a 40,000-kw power station being built by the Savannah Electric & Power Co., Savannah, Ga.

The utility, after comparing the cost of oil and gas firing versus coal firing, has concluded that it will save $250,000 annually based on 1955's fuel prices, $500,000 annually based on current fuel prices. The new plant, named the Port Wentworth Power Station, will cost Savannah Electric & Power $90 million to build.

A retired mine worker won a judgment of $3,950 against the Anthracite Health & Welfare Fund.

The mine worker, John Dragon, Sweet Valley Pa., had declared before a Wilkes-Barre, Pa., judge that he was due retirement payments from July, 1951 to August, 1955. A former Glen Alden employee, Mr. Dragon had not been granted a pension by the Anthracite Fund until September, 1955. Trustees of the Fund argued that Mr. Dragon had not qualified for pension payments under Fund rules that give the trustees "discretionary powers." The court said, "In August, 1955, 4 yr after the plaintiff became eligible, the trustees exercised their discretion and he (Dragon) was granted a pension. There was no change in the circumstances between the

Preparation Facilities

Amigo Smokeless Coal Co., Amigo, W. Va.—Contract closed with the Fuel Process Co. for a 1-M-6 Belknap heavy media coal washer, dewatering equipment, etc. Plant is designed to treat 150 tph of 4x¼ coal. Scheduled completion date July 1, 1957.

West Virginia-Kentucky Coal Corp, McAndrews, Ky. — Contract closed with the Daniels Co., Contractors, Inc. for a complete new preparation plant, including a DMS dense media precision coal washer. Capacity, 180 tph. Completion expected in July, 1957.

Brule Smokeless Coal Co., Otsego, W. Va.—Contract closed with Robert Holmes & Bros., Inc. for one Baughman Verti-Vane thermal fine coal dryer unit. Total wet feed, 110 tph of ⅜x0 filtered, washed coal. Surface moisture of the coal is to be reduced to 2 or 3%.

Saginaw Dock & Terminal Co., St. Clairsville, Ohio — Contract closed with Robert Holmes & Bros., Inc. for one Baughman Verti-Vane thermal fine coal dryer unit. Total wet feed, 125 tph of ⅝x0 raw coal. Surface moisture of coal to be reduced to 2 or 3%.

Omar Mining Co., Omar, W. Va.—Contract closed with McNally Pittsburg Mfg. Corp. for design, fabrication, and erection of a wet cleaning and thermal drying plant addition to the existing plan. The addition is to process 200 tph of ¼x0 coal. In addition, storage for 800 tons of ¼x0 raw coal will be provided, with provision for adding 600 to 1,200 tons later. Scheduled completion is January, 1958.

U. S. Steel Corp., Alpheus, W. Va. Delivery of 24 SuperDuty diagonal deck No. 7 coal washing tables and six Concenco revolving feed distributors to complete contract closed with the Deister Concentrator Co. for 64 tables and 15 feed distributors.

Galloway Land Co., Dawson Mine, Dawmont, W. Va.—Contract closed with the Fuel Process Co. for a cleaning plant addition to the present tipple. Equipment will include a ROM crusher, a 400-ton surge bin with reciprocating feeder, raw coal screen, an M-8 heavy media washer, sizing screen, dewatering screen. Capacity, 350 tph ROM. Completion date, Sept. 1, 1957.

Slab Fork Coal Co., Slab Fork, W. Va.—Contract closed with the Eimco Corp. for a 6-ft diameter, two-disc Agidisc filter complete with auxiliaries. The filter will handle about 3 tph of solids from 8-in diameter Heyl & Patterson cyclones. Completion date, October, 1957.

Pocahontas Fuel Co., Itmann, W. Va.—Contract closed with the Deister Concentrator Co. for one Concenco "77" double-deck coal washing table.

Coal Castle Fuels, Inc., Minersville, Pa.—Contract closed with the Deister Concentrator Co. for two Model 109 Concenco feed distributors —an eight-way split unit, and a four-way split unit.

Little Dog Coal Co., Gillespie, Ill. —Contract closed with the Deister Concentrator Co. for one Model 109 Concenco revolving feed distributor.

Powhatan Mining Co., Mine No. 1, Powhatan Point, Ohio — Contract closed with the Kanawha Mfg Co. for a barge-loading river plant. The equipment comprises a 600-ft belt conveyor extending from preparation plant to the river, with a 100-ft hinged boom section to permit barge loading 35 ft above pool. Capacity, 500 tph.

Conemaugh Mining Co., Seward, Pa.—Contract closed with the Kanawha Mfg Co. for a coal handling system from a shaft mine and trucks to a Bradford breaker. The system includes continuous weighing, automatic sampling, sample reduction, and facilities for rock disposal by truck. Capacity, 300 tph.

Valley Camp Coal Co., Mine No. 8, Shrewsbury, W. Va.—Contract closed with the Kanawha Mfg. Co. for a truck unloading system to deliver coal to existing storage bins at 300 tph. The system is designed to receive Winifrede seam coal from a declined belt conveyor.

Slab Fork Coal Co., Slab Fork, W. Va.—Contract closed with the Kanawha Mfg. Co. for a water clarification and fine coal recovery circuit, including Heyl & Patterson cyclones and an Eimco disc filter. Quantity of water treated, 350 gpm. Estimated quantity of recovered solids, 3 tph.

Winding Gulf Coals, Inc., Tams, W. Va.—Contract closed with the Kanawha Mfg. Co. for a circuit to remove fine solids from plant bleed. The circuit consists of Heyl & Patterson cyclones and filter screen. Quantity of water treated, 250 gpm. Estimated quantity of recovered solids, 3½ tph.

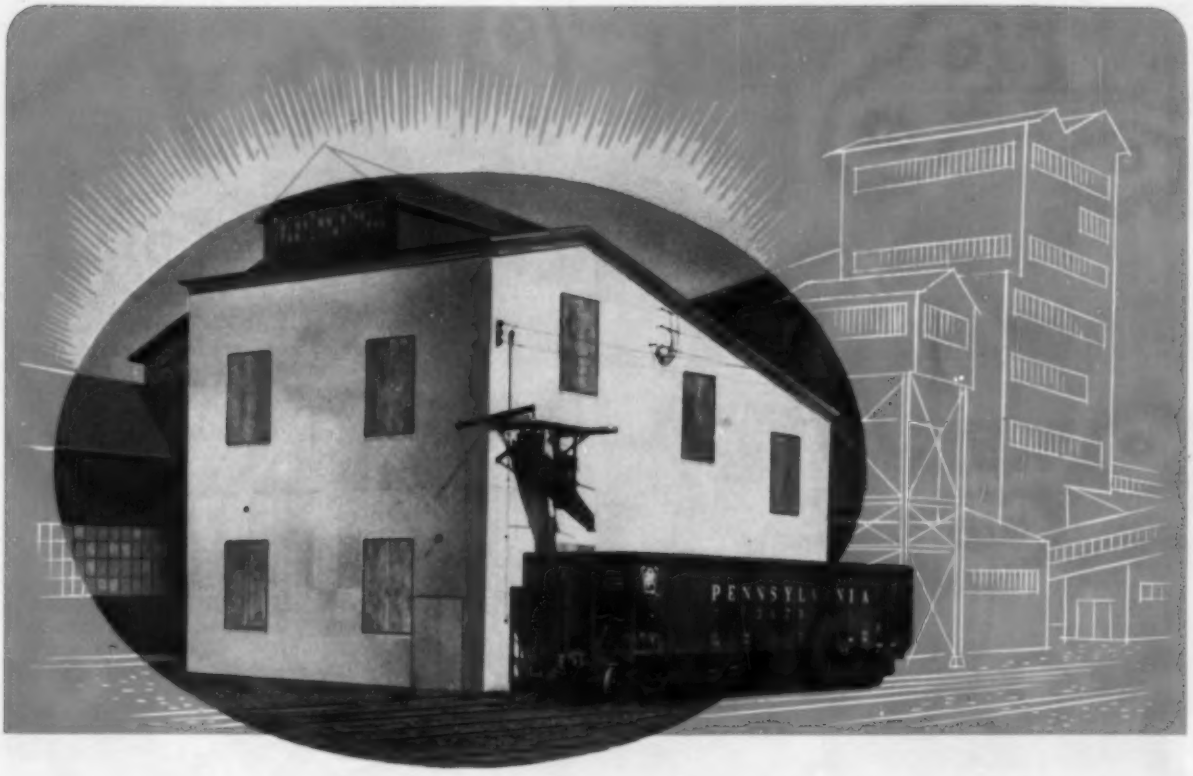
Winding Gulf Coals., Inc., McAlpin, W. Va.—Contract closed with the Kanawha Mfg. Co. for picking facilities to remove mine rock from mine run ahead of preparation plant. Facilities include a Lecco combination picking table and scalping screen. Capacity, 300 tph ROM.

Dawson Collieries, Inc., Dawson Springs, Ky.—Contract closed with the Daniels Co., Contractors, Inc., for a complete new preparation plant including a DMS dense media washery. Estimated completion, July, 1957.

Dawson Daylight Coal Co., Dawson Springs, Ky.—Contract closed with the Daniels Co., Contractors, Inc., for a new preparation plant, including a DMS dense media washery. Estimated completion, July, 1957.

Pocahontas Fuel Co., Crane Creek Mine, McComas, W. Va.—Contract closed with the Daniels Co. for a fine coal preparation plant, including No. 77 washing tables, feed preparation for metering, and a de-watering circuit. Completion, May, 1957.

Pocahontas Fuel Co., Amonate, W. Va.—Contract closed with the Daniels Co. for a froth flotation plant to handle extreme fines contained in wash water circuits. Froth flotation plant is to produce fine coal with vacuum filtration for dewatering. Completion expected July, 1957.



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WILMOT FINE-COAL SYSTEM ADDS 200 TONS DAILY TO PRODUCTION

For Complete Details Visit BOOTH 332 at COAL SHOW

See Working Model of Wilmot-OCC Heavy-Media Vessel

JEDDO-HIGHLAND COAL CO., at its No. 7 plant, had a slurry effluent of 2250 gallons a minute, the solids content of which was 8 to 10%. The compact fine-coal preparation plant, shown in circle above, was designed and built to treat the wasted effluent. The new facility has increased the yield of fine coal from 40 to 240 tons a day. With an increasing market for fines, Jeddo-Highland has enjoyed an especially good acceptance for this new product because of its premium low-ash quality. The Wilmot fine-coal system consists of a Wilmot Hydrotator and a Wilmot froth-flotation machine. A sizing screen prepares the feed to the two machines and a vibrator dewaters the product. With the aid of Wilmot automatic features and push-button controls, one man operates the plant.

PREPARATION ENGINEERS for nearly 50 Years -- Plants built and/or equipped. H. M. S., Hydrotator, Classifier, Froth units. Pilot plant and lab for customers' use.

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A brand new **WILD** *instrument that's breaking records for speed, accuracy, easy set-up and operation!*

The T-16 embodies many brilliant new concepts. They add up to a degree of optical and mechanical precision, as well as versatility, that you'll find *impossible to duplicate with any other instrument at this price.*

NOTABLE FEATURES OF THE WILD T-16

- Direct scale reading to 1 minute; interpolation to 20 seconds.
- Azimuth and vertical scales seen simultaneously and read directly.
- Built-in repeating clamp for setting on zero. Eliminates lower plate motions.
- New optical plumb with upright image to speed setting up.
- Optional accessories include battery box providing illumination for scales, level vials and telescope reticle.
- Excellent for mining, highway and land surveying.

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News Roundup *(Continued)*

date of his retirement and the date of the granting of the pensions, yet the trustees have refused to pay him for any period to September, 1955. We think it is perfectly obvious that if the plaintiff was entitled to a pension in September, 1955. Based upon the same facts as were present in July, 1951, the pension should have been made retroactive to that date." The decision was handed down by Judge John J. Aponick.

New Mexico's Koehler mine near Raton, once one of the state's biggest producers, is being readied for renewed operations by its new owner, Kaiser Steel Corp.

Kaiser, according to confirmed reports, is prepared to spend $1.5 million to develop and modernize the Koehler operations by mid-1958 when the company's Hugo blast furnace in Fontana, Cal., will begin operation. Approximately 150 miners will be employed instead of the 50 at work now.

The Coal Mining Section of the National Safety Council announced its 1957-58 national compaign to prevent injuries from roof falls.

The object is a general reduction of 50% in the frequency of injuries from roof, rib, and face falls. The campaign begins July 1, 1957, and will terminate June 30, 1958. Its sponsors are coal associations, government agencies, the United Mine Workers of America, and a number of safety organizations. Any underground coal mine is eligible to participate in the campaign. The only requirements are a simple injury report covering experience with roof fall accidents for 1 yr, 2 yr, and 3 yr previous to the beginning of the campaign, and a report covering the last 6 mos. If a company operates two or more mines, each mine participates separately. The National Safety Council will award certificates to all mines achieving the campaign goal or going through the campaign year without a disabling lost-time injury, provided the mine conducts at least six activities aimed at the prevention of roof, rib, and face falls.

Current Coal Patents

By Oliver S. North

Apparatus for gasifying coal, C. E. Alleman (assigned to Phillips Petroleum Co., a corporation of Del.), Mar. 26, 1957. An apparatus for use in the underground gasification of coal seams that are low grade, thin, or steeply dipping No. 2,786,660.

Plow-type cutter conveyor combination having slack coal clearing means, J. G. Krapels (assigned to Stamicarbon N. V., Heerlen, Netherlands), Mar. 26, 1957. The described cutter-conveyor is provided with improved means for preventing slack coal being forced inwardly under the conveyor wall, thus nullify-

cut bearing maintenance . . . with one lubricant

Nebula EP – another first for Esso Research – is a multi-purpose grease that *out-performs* all other multi-purpose greases. And many specialized greases as well!

Nebula EP works exceptionally well in ball, tapered roller and roller bearings – of *all sizes* from rolling mills to precision instruments.

Nebula EP stands up under extreme heat. It retains its lubricating qualities at high temperatures at which many special heat-resistant greases would have broken down.

And Nebula EP has exceptional water-resistant and rust-preventive properties – an important consideration where water is a factor. What's more, Nebula EP is formulated with a true soap which gives it extra anti-wear and load-carrying characteristics – for an extra margin of protection. High oxidation stability gives Nebula EP longer life in storage and in use.

Nebula EP can be applied by *any* of the conventional methods. Get the whole story about this fine product . . . from your nearest Esso Standard Oil Company Division Office: Boston; Pelham, N. Y.; Elizabeth, N. J.; Bala-Cynwyd, Pa.; Baltimore; Richmond; Charlotte; Columbia, S. C.; Memphis; New Orleans.

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PETROLEUM PRODUCTS

WHILE YOU'RE AT THE COAL SHOW . . .

Learn How to Cut Field Downtime Due to Hose Line Troubles

Visit Aeroquip Booths 917-919, Main Exhibit Hall, Cleveland Auditorium, May 13-16. Hose Line Specialists Will Show You How Aeroquip Reusable Fittings Save Time, Reduce Costs

Don't miss this opportunity to see why many operators of coal mining equipment have standardized on Aeroquip Hose Lines with Reusable Fittings for all replacement lines. At the Aeroquip Booth, you can see hose assemblies made in a matter of minutes. And you will readily understand how a small, portable supply of Aeroquip Hose and Fittings assures quick hose line replacement right in the field . . . gets equipment back to work fast . . . reduces operating costs.

On display at the show will be these Aeroquip Products for all types of mining equipment:

COAL SHOOTING HOSE LINES
HIGH PRESSURE HYDRAULIC HOSE LINES
MEDIUM PRESSURE HOSE LINES
LOW PRESSURE HOSE LINES
COMPRESSOR DISCHARGE HOSE LINES
TEFLON HOSE LINES
SELF-SEALING COUPLINGS

If you can't make the Coal Show, see your Aeroquip Distributor. He's listed in the Yellow Pages of your Telephone Directory.

Aeroquip
REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN
IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 10, ONTARIO
LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U. S. A. AND ABROAD
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

Coal Patents *(Continued)*

ing the usual tendency of the apparatus to "climb" the seam as it advances. No. 2,786,662.

Coal cutting bit having a skewed cutting face, H. M. Morrow (assigned to The Bowdil Co., address not listed), Mar. 26, 1957. A design for an improved cutting bit having skew faces. The bit has high cutting efficiency in coal and requires a minimum of power to operate. Nos. 2,786,663 and 2,786,664.

Composition for binding coal dust, H. Buggisch, J. Müller-Römer, and H. Nees (assigned to Chemische Fabrik Kalk G. m. b. H., Koln-Kalk, Germany), Mar. 26, 1957. A composition useful for laying dust in coal mines comprises magnesium hydroxide, calcium chloride, laurylpolyglycol ether, and hydrated lime. A slurry of the materials is prepared, agitated, and allowed to stand until it reaches a pasty consistency. It is then sprayed on ceilings and coal faces. No. 2,786,815.

Cutter mounting for continuous mining machine, S. Bowman (assigned to Westinghouse Air Brake Co., a corporation of Pa.), Apr. 2, 1957. A continuous mining machine is equipped with a simple and efficient mechanism through which each cutting tool may be extended or retracted during rotation of the rotor heads in one direction. Kerfs of various diameters can be cut without the necessity of stopping or reversing the cutter heads. No. 2,787,456.

Mine roof belts with multiple piece shell having U-shaped spring holding means, C. P. McCabe (assigned to Republic Steel Corp., Cleveland, Ohio), Apr. 9, 1957. Design for an improved mine roof bolt having means to keep the anchor from sliding back on the bolt during insertion. The shell structure is made in two or more longitudinally separate sections. Relative rotation of bolt and anchor is prevented, so that the bolt may be drawn outwardly by turning a nut. No. 2,787,931.

Conveyor type loading machine, W. Whaley, Apr. 9, 1957. A coal conveyor loading machine is supported on traction devices of the caterpillar or crawler type. The shovel and the forward end of the main frame are vertically adjustable, for convenience in travel over uneven ground. No. 2,788,076.

Conveying machine, J. D. Russell (assigned to Joy Mfg. Co. Pittsburgh, Pa.), Apr. 9, 1957. Design for an extremely flexible jointed conveying machine having a swinging delivery end. The apparatus performs under a wide variety of conditions and requires only one electric motor to carry out its several functions. No. 2,788,114.

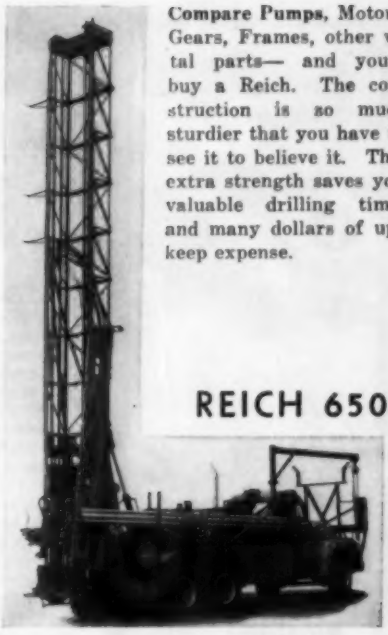
Extensible conveyor and control circuit therefore, C. O. Wood (assigned to Goodman Mfg. Co., Chicago, Ill.),

You'll be MONEY AHEAD

SEE THIS DRILL
at American Mining Congress Show, Booth 440

REICH 750

after you make these **TESTS** of drill rigs in same material



Compare Pumps, Motors, Gears, Frames, other vital parts— and you'll buy a Reich. The construction is so much sturdier that you have to see it to believe it. This extra strength saves you valuable drilling time, and many dollars of upkeep expense.

REICH 650

You'll get results like these — *4 recent tests:*

- **52% more hole** per hour drilled in hard dense sandstone by Reich Drill than by other rotary drill of the same rated capacity.
- **80% more hole** drilled by Reich 650-20 in shale and medium sandstone, than by other hydraulic powered rotary of same rated capacity.
- **Weighing 6½ tons less** than a crawler rotary that cost almost twice as much— Reich 650 drilled 7⅜" holes approximately as fast in hard tough sandstone.
- **238 ft. per hour** in medium sandstone and shale drilled by Reich 750-50 Crawler in 3½-hour test, drilling 40 to 50 ft. holes— including all moves.

(Full details of the above cases sent on request)

Where does the Reich get such speed? It's BUILT IN!

Exactly Right Drilling Speed in every material, from hardest to softest. The only hydraulic rotary with **infinitely variable drilling speed.**

Easiest operation with minimum of control levers and no "strong-arm" levers to slow the operator— all controls actuated by hydraulic power. **A real one-man drill rig.**

Faster stem loading of the Reich saves time and money on every hole. Less than a minute to add a stem. **Compare stem loading.**

←Hydraulic Stem Loader.

Barrel→ Stem Loader

Find out the Extra Profit you'll make with a Reich Drill. Records made by these rigs are not secrets. Inquire of owners nearest you, what results they are getting— we'll tell you where they are. They have found the Reich the biggest producer, by far the most profitable drill rig you can own. Write, wire or phone—

REICH BROS. MFG. CO., 1439 Ash Street, Terre Haute, Indiana

It will pay you to buy what REICH has for you NOW

(You'll out-drill the machines being built like the Reichs of several years ago)

They're Interchangeable
They're Simple
They're Quick

Put Economy and Flexibility in your Pipelines

STANDARD and LIGHTWEIGHT
ALUMIRON COUPLINGS
(Made in Aluminum or Malleable Iron)
For Grooved End Pipe

● Think back—remember the effort required to make and complete pipeline joints? Now you can do it an easier way with these two-bolt malleable iron Couplings. Pipeline progress dictated the design of Alumiron Couplings making them the simple, quick, positive, low cost way to join grooved-end steel, aluminum, cast and wrought iron and spiral pipe.

● Alumiron speedily joins grooved-end pipe by the mere tightening of two bolts which run through the coupling halves. The Buna N or oil resistant Neoprene gasket inside the coupling halves firmly and evenly grips the pipe ends making a leak-proof seal which increases as pipeline pressure mounts. This flexible Coupling permits the line to "come and go" with rough and uneven terrain. Component parts are interchangeable with other grooved-end couplings.

● Standard Series to 1,000 PSI working pressure in sizes 1" through 8". Lightweight Series to 500 PSI working pressure in sizes 2", 2½", 3", 4".

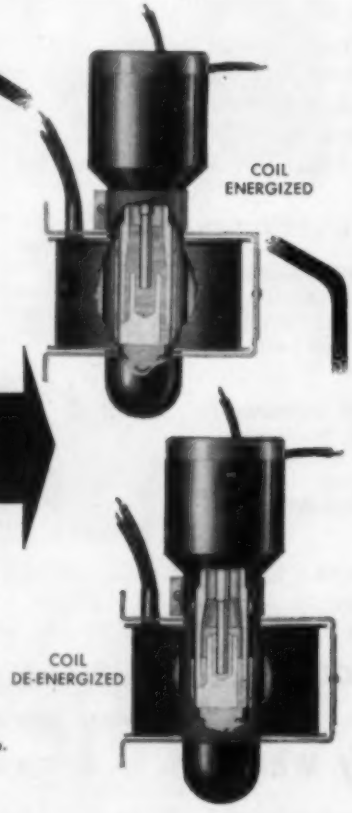
Send for literature and prices. Distributor territories open.

CHARLES E. MANNING CO.
4700 CLAIRTON BLVD.
PITTSBURGH 36, PA.

The TIMER RELAY that handles all controlled timing problems . . .

★ No false contacts
★ Non sticking
★ Practically "fail safe"
★ Low cost timer

Durakool®
STEEL MERCURY TIMERS



This steel clad, factory set, tamper proof Durakool timer-relay is practically non-breakable. Operating life multiplied 5 to 6 times by new plunger construction features. Combinations of operate-release time delays from 0.15 sec. to 20 sec.—either normally open or normally closed action.

See telephone directory for local distributor, or write.

DURAKOOL, INC.
ELKHART, INDIANA, U.S.A.
700 WESTON RD., TORONTO 9, CANADA

Coal Patents (*Continued*)

Apr. 9, 1957. An improved control circuit for extending a conveyor belt both during movement of the belt and while it is stationary, and for controlling belt tension. No. 2,788,116.

Drill steel centralizer for coal drill, R. F. Hale (assigned to Joy Mfg. Co.,
(*Continued on p 261*)

Association Activities

Henry F. Warden, president of the American Coal Co., was elected president of the Pocahontas Operators Association of Bluefield, W. Va. during an annual meeting held in New York. Also elected were: **W. W. Walker,** president of the Ashland Mining Corp., vice president; **Norton Stone,** president of the United Pocahontas Coal Co., treasurer, and **B. B. Houseman,** secretary.

The Colorado & New Mexico Coal Operators Association elected **W. W. Brown** president of the association during a recent meeting. Mr. Brown is assistant manager of the Edna Coal Co., Denver. **J. S. Besser,** manager of sales, Fuel Dept., Colorado Fuel & Iron Corp. was elected first vice president. **Claude P. Heiner,** president of the Minerals Development Corp., Salt Lake City, was elected second vice president. O. M. Hanks, an associate of the Colorado & Utah Coal Co., and the Colowyo Coal Co., Denver, was elected treasurer.

W. J. O'Connor, president and general manager of the Independent Coal & Coke Co., Salt Lake City, Utah, was elected president of the Utah Coal Operators Association. Mr. O'Connor succeeds **A. B. Foulger,** vice president and general manager of the Lion Coal Co. Elected to a vice presidency was **Walker Kennedy,** president of the Liberty Fuel Co. **T. J. Canavan** was elected executive secretary-treasurer; **David A. James** assistant treasurer; and **Mrs. Clara Outsen,** assistant secretary.

DIESEL FUEL and LUBRICATION

BULETIN

CITIES SERVICE

TESTS SHOW CITIES SERVICE C-300 OIL HAS LOWEST BEARING LOSS

L-4 72 Hr. Engine Run

Bearing Loss, Ave mg.

CITIES SERVICE C-300 OIL	Brand A Oil	Brand B Oil	Brand C Oil	Brand D Oil	Brand E Oil	Brand F Oil	Brand G Oil
54	550	106	170	1109	601	89	1425

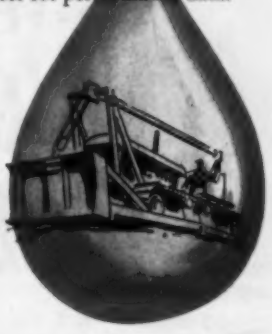
New test data reveals excellent reasons why sales of Cities Service C-300 Oil have doubled in two years.

These tests, comparing C-300 with 7 leading competitive oils, demonstrate that it has by far the lowest bearing loss of all oils tested.

In addition, the over-all performance rating of Cities Service C-300—which takes into account all aspects such as corrosion and oxidation resistance, oil consumption, and detergency—was also highest of all oils tested.

For diesel trucks, buses, farm equipment, and stationary diesels, Cities Service C-300 is unsurpassed. Ask your Cities Service Lubrication Engineer for performance data.

CITIES SERVICE DEVELOPS NEW OIL FOR SEVERE-DUTY EARTH MOVING MACHINERY



To meet the exacting requirements of certain severe-duty earth movers now manufactured by the Caterpillar Tractor Company and others, Cities Service has developed an extremely rugged new oil.

Known as Cities Service C-500, this new oil is approved by Caterpillar and specially made for service as a Series 3 Oil.

Your lubrication engineer will gladly discuss the features of this new oil and the precise machinery and conditions for which it is intended.

OVER 10,000 HOURS WITH CITIES SERVICE C-400 OIL— PISTONS CLEAN AS NEW!

A Mississippi tug was having trouble. Ring breakage and oil consumption made overhaul necessary practically every time it was docked.

Then Cities Service C-400 Diesel Engine Oil was tested.

Result: After over 10,000 hours, pistons were like new. No stuck or broken rings. Horsepower was increased 5%. Oil consumption chopped in half!

This story is typical of the kind of problems Cities Service solves throughout the year. If you have lubrication difficulties, consult your Cities Service Lubrication Engineer . . . it may save you a bundle.

MAN YOU SHOULD KNOW

William J. Varetoni is a Lubrication Engineer and Technical Consultant with the Cities Service office at 60 Wall Street, New York, N. Y. With 27 years' experience in the solution of lubrication problems, he is typical of the many Cities Service Lubrication Engineers who will gladly investigate your problems without obligation. A call to the nearest Cities Service office will bring one of these men to your plant or job site.

CLEVELAND MINING NEWS

EXTRA

EXTRA

MAY 13-16

COMPTON TO DISPLAY NEW MINING EQUIPMENT IN BOOTH 1756 AMERICAN MINING CONGRESS

Compton, Inc.

ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

CLARKSBURG, WEST VIRGINIA

Books for Coal Men

Rock Blasting

Manual on Rock Blasting, edited by Dr. K. H. Fraenkel, has been expanded with a fourth supplement, including articles on sub-level caving in Swedish mines, the effects of blasting on nearby structures, and compressed air lines for mines and construction sites. *Complete two-volume manual, including all four supplements, available at a production cost of $28.90; new supplement $3. Atlas Copco Eastern, Inc., Paterson, N. J. or Atlas Copco Pacific, Inc., San Carlos, Calif.*

Combustion

Combustion of Solid Fuels in Thin Beds, by E. P. Carman, E. G. Graf and R. C. Corey. This report supplies information on the effects of variables in operating conditions while using traveling-grate stokers. Tests were made with all types of coals, ranging from anthracite to lignite, under carefully controlled and observed conditions. *USBM Bulletin 563. 92 pp. 8x10¼-in; paper 65¢, Superintendent of Documents, Government Printing office, Washington 25, D. C.*

Roof-Bolting Tests

Anchorage Testing of Mine-Roof Bolts Part 3. Expansion-Type 5/8-in Bolts, by A. J. Barry, L. A. Panek and J. A. McCormick. This report covers 30 tests made at two West Virginia mines with 5/8- and 3/4-in expansion-type bolts to determine the effectiveness of each. *R. I. 5310. Free, Bureau of Mines, Publications-Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Mine-Rescue Phones

Development of a Transistor-Type Telephone System for Mine-Rescue Operations, by C. L. Brown describes an electrically powered portable telephone system that can be used safely during rescue operations. *R. I. 5318. Free, Bureau of Mines, Publications-Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Flotation

Flotation, by A. M. Gaudin is the second edition of this work and has been completely rewritten to reflect changes in technology in the past 25 yr. It is a scientific analysis of the foundations, technology and applications of flotation for separating dissimilar fine solids. *573 pp. $12.50, McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y.*

Mine Water

Evaluation of Mine Drainage Water, by S. A. Braley is a report that is designed to clear up some of the confusion regarding the importance of various components of acid mine water. *Free, Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Pa.*

an ACCO product

American Cable TRU-LAY VHS | 15% STRONGER

New VHS Dragline Lasts 73% Longer

Draglines on the excavator above, used in coal stripping operations at the Kingston Mining Company, Plymouth, Pa., get really rough service. The best Improved Plow Steel lines formerly lasted only 700 hours.

Now, however, lines of new TRU-LAY VHS are averaging 1,250 hours —giving 73% longer service life.

Records like these are being duplicated by VHS Draglines all over the country. For new VHS is tougher—more wear resistant. And it has all the advantages of preformed construction.

Your American Cable Distributor has TRU-LAY VHS *in stock now. See him or write to the nearest American Chain & Cable Company Office.*

STRONGER AND SAFER

New VHS is 15% stronger than Improved Plow Steel, which was the strongest available until now. Its additional strength enables you to handle heavier loads with the same diameter line. And it gives you a higher factor of safety during the entire service life of the rope.

FOR SHOVEL HOIST ROPES AND SLUSHER ROPES, TOO

TRU-LAY VHS was developed particularly for the toughest applications in the mining industry — draglines, shovel hoist ropes and slusher ropes. It stands up better under the rough treatment these ropes necessarily get.

LESS "DOWN TIME"—CUTS COSTS

Because it is tougher and more wear resistant, TRU-LAY VHS rope lasts longer, costs less to use and cuts "down time" of equipment for wire rope replacement.

TRU-LAY VHS ropes are easy to order. Just ask for TRU-LAY VHS Shovel Hoist Ropes, Slusher Ropes or Draglines, in the size you want. You don't need any complicated specifications.

ACCO American Cable Division
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to make a
PROFIT
from COAL FINES

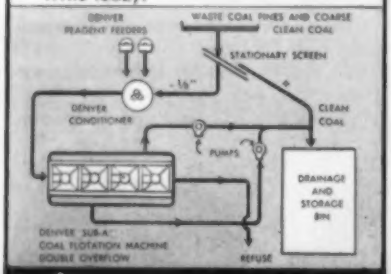
with
DENVER "Sub-A"
COAL FLOTATION

Simple...Low Cost!

You can handle coarse coal (—⅛"x0") at the head of your circuit in DENVER "Sub-A" Flotation Machine. You save coarse as well as fines in a coal product which is easily dewatered! You have simple, low-cost system.

Over 90% of all coal flotation plants in U. S. are Denver "Sub-A", an outstanding testimonial to DECO's experience, engineering "know-how" and equipment.

DECO can provide complete testing, engineering service, flow-sheet design and all equipment for your coal flotation plant. One source of supply, one responsibility. Write today!



DENVER
EQUIPMENT CO.
1400 Seventeenth St. Denver 17, Colorado

Sales Through Research
BCR Meeting Theme

Mining and utilization research today and tomorrow. How research results are being used to build business.

IN THIRTEEN FORMAL REPORTS and accompanying informal discussion the bituminous industry examined its research program, canvassed the results and considered their application to building business at the 1957 Annual Meeting and Techno-Sales Conference of Bituminous Coal Research, Inc., White Sulphur Springs, W. Va., April 18-19.

In addition to the two business sessions, presided over by Carlton R. Mabley Jr., president, Island Creek Coal Sales Co., and Henry C. Woods, chairman of the board, Sahara Coal Co., the institute made its annual award at a banquet session with Julian E. Tobey, president, Appalachian Coals, Inc., as toastmaster.

The BCR award, "for exemplary achievements in promoting coal-research support, utilizing BCR research to expand markets, or otherwise contributing to the progress of the bituminous coal industry through a BCR activity," was presented to Charles E. Lawall, vice president, coal traffic and development, Chesapeake & Ohio Ry. In making the presentation, Dean A. A. Potter, BCR president, noted that Mr. Lawall was "selected for the citation, first, because of his long and capable chairmanship of the Mining Development Committee of Bituminous Coal Research, Inc.; second, for the work that he and his staff have done to help expedite the work of the general research program; and third, because of his personal promotion of support for industry-sponsored coal research."

The first BCR award was presented to the late R. Hartley Sherwood, president, Central Indiana Coal Co., in 1953, followed by awards to J. B. Morrow, mining consultant and former BCR president, in 1954; and to Mr. Tobey and Earl Payne consulting engineer, Pittsburgh Consolidation Coal Co., in 1955.

CHARLES E. LAWALL
Receives BCR Award

BCI-BCR RELATIONSHIP

Maynard L. Patton, Executive Vice President, Bituminous Coal Institute; Vice President in Charge of Sales, Truax-Traer Coal Co.

"Bituminous Coal Research, Inc., and Bituminous Coal Institute each had origin in the judgment and courage of far-sighted leaders of the industry, who analyzed the problems and needs as they saw them, and decided on these particular organizations as the best vehicles to work out the answers that are necessary to our welfare . . .

"Important to any discussion of industry expansion in market promotion is the question, most often raised, as to whether coal can be best sold by each corporation selling its own product—whether we are to accept things as they are and drive, as individuals, to get our share of the business in the broad competition of coal v. coal. By no means playing down the highly necessary effort of individual selling, the unanimous conclusions are that the industry must improve the position of coal in the energy field by an integrated program of matching our technical manpower, modern equipment and selling techniques against well-organized programs and campaigns of competitive fuels, thereby seeking to elevate the coal industry to a more-favorable basis with other industries that all around us are taking united action to develop and expand the use of their products . . .

"Conversions from coal to other energy use follow the aggressive programs of the industries that play up all the advantages of the use of 'flowing fuels,' and often present distorted facts as to the value of coal. Curbing conversions away from coal depends upon a number of things: engineering know-how about both coal and other fuels, design, modern equipment, capital costs, and the economy of operating. We must supply these necessary things and meet, with at least equal skills, the programs and tactics of our competitors . . .

"We are most gratified over the wins

An Amoco lubrication expert will help you...

FINGER THE HIDDEN PROFITS

It's amazing what a change in specifications can do. The right lubrication . . . in the right place . . . applied at the right time . . . can increase your output, lower your lubrication costs. *Uncover* hidden production and profits with an Amoco survey at no cost to you. Get the big picture and get it *right* by contacting an Amoco mine lubrication engineer . . . NOW.

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Higher Quality... for Better Lubrication... at Lower Cost.

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METHOD OF PIPING

VICTAULIC HAS EVERYTHING...

VICTAULIC COUPLINGS
Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

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For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 8".

VICTAULIC SNAP-JOINTS
The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

COUPLINGS FOR EVERY PIPING JOB

VICTAULIC FULL-FLOW FITTINGS
Elbows, Tees, Reducers, Laterals, a *complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".

VIC-GROOVER TOOLS
Time saving, on-the-job grooving tools. Light weight, easy to handle — operate manually or from any power drive. Sizes ¾" to 8".

PLUS FITTINGS AND GROOVING TOOLS

"EASIEST WAY TO MAKE ENDS MEET"

Promptly available from distributor stocks coast to coast.
Write for NEW Victaulic Catalog-Manual No. 55A-5

VICTAULIC COMPANY OF AMERICA
P. O. BOX 509 • Elizabeth, N. J.

BCR Meeting *(Continued)*

that already have been chalked up within our territory market in saving and acquiring markets for coal. They are better than we expected. Because of the limited number of technical people that we can employ, we have to rely on organized field support of all groups that are interested in coal. The widespread grassroots acceptance of our program, and the support given by field representatives of all industries allied to coal, is, again, more than we expected. We believe that the swing is to coal."

TROUBLE-SHOOTING BY SALESMEN IN SMALL PLANTS

Vaughn Mansfield, Chief Engineer, Peabody-Southern Coal Co.

"The small-plant user is very important because it is in the small plant that both mechanical and human failures are most frequent. It is here that coal promptly gets the blame whenever trouble develops. It is here that the salesman must be able to render his company and his customer a real service by knowing the fundamentals of trouble-shooting . . .

"I am convinced that the average salesman, with proper training, can become proficient in handling complaints and solving firing troubles in small plants. Proper training for this work is the all-important item. It is for this reason that the American Coal Sales Association has sponsored its several training programs . . . I do not advocate that all salesmen should be engineers but I do recommend that you select men with reasonable mechanical ability as well as sales personality . . .

"Whether your salesman has attended one of the ACSA short courses or not, he needs in-company training by your company engineer. Success here requires teamwork between your sales force and combustion engineer. The salesman and the engineer should keep each other informed of all complaints or trouble calls. If the engineer is required on a specific complaint, he should be accompanied by the salesman if at all possible. Much successful training can be accomplished by these joint calls. After a few teamwork visits the salesman will find he can spot mechanical failures as well as the engineer. Often he can detect human failures better than the engineer. That is why teamwork between the engineer and salesman can be highly rewarding."

TECHNICAL TRAINING FOR COAL SALESMEN

Dr. Paul L. Brown, Director, Sales Training and Education, American Coal Sales Association.

"Industrial buyers of fuel are becoming better informed—and consequently less tolerant of those who are poorly informed on technical matters. Among large- and medium-sized purchasers, at least, intelligent attention to the matter of steam costs, plant maintenance costs and over-all fuel efficiency is the rule, not the exception.

"Even among buyers for the smaller

VISIT BOOTH #2118—AMERICAN MINING CONGRESS—CLEVELAND, MAY 13-16.

PREPARATION PERFORMANCE

preceded by

60

Successful Years . . .

A FAIRMONT -built Preparation Plant

is in a class all by itself

YOURS: All the modern developments plus all the exclusive advantages of FAIRMONT -engineering and FAIRMONT -construction

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

. . . A special form of Carbon ideally suited for industrial explosives is used in AKREMITE, new blasting medium developed and patented by the Maumee Collieries Co.
M-1 BLACK

AKREMITE *prepared with* M-1 BLACK

assures efficient, safe and economical results in strip mining. Millions of pounds have been shot to date without misfire or accident.

For perfect AKREMITE results, M-1 BLACK *is the carbon to use.*

Samples and Technical Data Furnished on Request to Licensees

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CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

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Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

BCR Meeting *(Continued)*

plants, some are becoming increasingly aware of the need for a better understanding of coal utilization, and have a growing recognition, too, that the coal salesman is—or should be—the logical source of this knowledge. Unfortunately, however, most of the small purchasers do not have this appreciation or knowledge. Thus it is up to the salesman to perform the educational job if oil and gas competition in this market is to be met effectively. It is the salesman who must assume the principal responsibility for seeing that these plants get progressively better efficiency and lower steam costs . . .

"What can the individual firm faced with this problem do about it in terms of a practical and realistic training program? The heart of the answer lies in a very old but very sound training formula applicable to all si.uations . . .

"First, a company must set forth in detail exactly what it wants its men to know and be able to do. And this means a formal written statement of the requiremen s and objectives . . .

"Step No. 2 of the training formula calls for an accurate inventory and evaluation of each salesman to determine just how much technical knowledge of coal utilization he now has.

"The next step is purely a matter of subtraction. You deduct each man's present knowledge from what he should know. The remainder is what he must be taught—the objective of our training program.

"The fourth step obviously is to design a technical training program that will do the desired job . . .

"The final step in the training program is the follow-through—the execution, the administration of the training program. Not only does it mean getting the program off the ground, so to speak, but it includes periodic reviews and appraisals, and occasional revision which become necessary as needs change."

BITUMINOUS COAL RESEARCH IN THE GOVERNMENT

T. Reed Scollon, Chief Division of Bituminous Coal, and **Harry Perry,** Chief, Branch of Bituminous Coal Research, U. S. Bureau of Mines.

"The picture of total energy demand in the United States looks good for coal. It is estimated that between now and 1975 the demand for energy will increase roughly two-thirds and that the demand for coal exports will be substantial.

"In 1956, bituminous coal supplied about 32% of the total energy produced in the United States—a decided upturn from the all-time low of 29% in 1954. If we assume that coal will retain only its present share of the energy market, by 1975 the estimated requirement for coal would be approximately 810 million tons.

"If we assume that coal will increase its share of the energy market only 5% (that is, to 37%) the total coal needed would be roughly 935 million tons . . .

"But to hold its share of the energy market—if not to increase it—coal will

(Continued on p 254)

the HANNA* story about... GUNDLACH crushers

The GUNDLACH CRUSHER crushed more coal in 9 months than previous crushers crushed in a full year!

INCREASED PRODUCTION!

The GUNDLACH CRUSHER averaged 390 TPH crushing over 1,000,000 tons with total maintenance cost... only $318.00

LOWER MAINTENANCE!

SEE US AT BOOTH NUMBER 617

Or a Maintenance Cost of 32¢ per 1000 Tons!

*

In January 1956, Hanna's Georgetown, Ohio Preparation Plant, one of the largest coal cleaning plants in the United States, installed their first **GUNDLACH** Crusher which was required to reduce 7" x 1¼" washed coal to 1¼" top size at a rate of 350 TPH.

Prior to the installation of the **GUNDLACH** Crusher, Hanna encountered trouble with an oversize product (plus 1¼") overloading the recirculation screens and conveyors, which in effect decreased overall plant capacity.

Not only did the **GUNDLACH** Crusher more than meet the capacity required, but it also eliminated the overloading condition in the recirculating equipment which greatly increased overall plant capacity. In addition the **GUNDLACH** Crusher as compared to the crusher it replaced reduced the percentage of fines, consequently better screening resulted. It delivered an average of 390 TPH, crushing over a million tons from Jan. 13 to Oct. 31, 1956 and . . . at the relatively negligible low cost of only $318.00 for total maintenance, broken down as follows:

Replacement Parts: (Includes welding rod for tooth build-ups)	**$ 36.00**
Labor: Hanna's actual cost for tooth build-ups and installation. (Some at overtime rate)	**$282.00**
Total cost per 1,000,000 tons	**$318.00**

BECAUSE OF THE OUTSTANDING PERFORMANCE OF THIS CRUSHER, HANNA HAS RECENTLY PURCHASED FOUR MORE GUNDLACH TWO-STAGE CRUSHERS.

Perhaps we can help you as we have helped Hanna. We have a crushing engineer in your area, just give us a call.

T. J. GUNDLACH MACHINE CO.

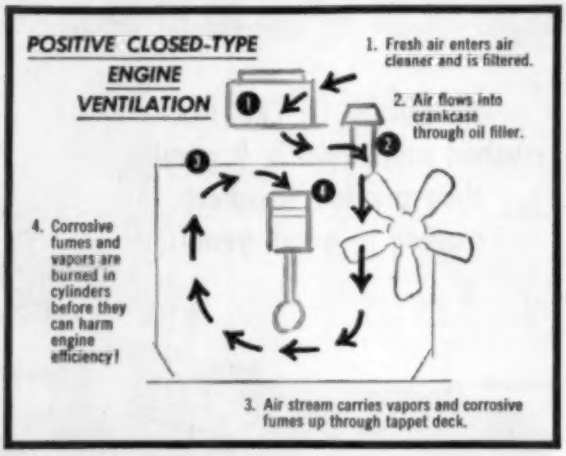
DIVISION OF J. M. J. INDUSTRIES, INC.

BELLEVILLE, ILLINOIS

"CLEAN LIVING" GIVES A CHEVY ENGINE LONGER LIFE!

...more evidence that Chevrolet Task-Force trucks are engineered better and built better for bigger savings!

This drawing shows, roughly, one of the ways in which Chevrolet truck engines minimize a major cause of wear—dirt! Now consider this additional evidence that Chevy heavy-duty V8's and 6's "live clean" and bring you fleet, dependable power that costs less to use!


POSITIVE CLOSED-TYPE ENGINE VENTILATION
1. Fresh air enters air cleaner and is filtered.
2. Air flows into crankcase through oil filler.
3. Air stream carries vapors and corrosive fumes up through tappet deck.
4. Corrosive fumes and vapors are burned in cylinders before they can harm engine efficiency!

Extra filters give extra-clean fuel—Only *clean* fuel reaches the engine—that's one reason you can depend on a Chevrolet truck! All fuel is filtered twice (once in the fuel tank and again in the carburetor) to keep dirt and water from hampering efficient operation. Chevrolet truck V8's *provide* a *third* filter, at the carburetor, for triple protection!

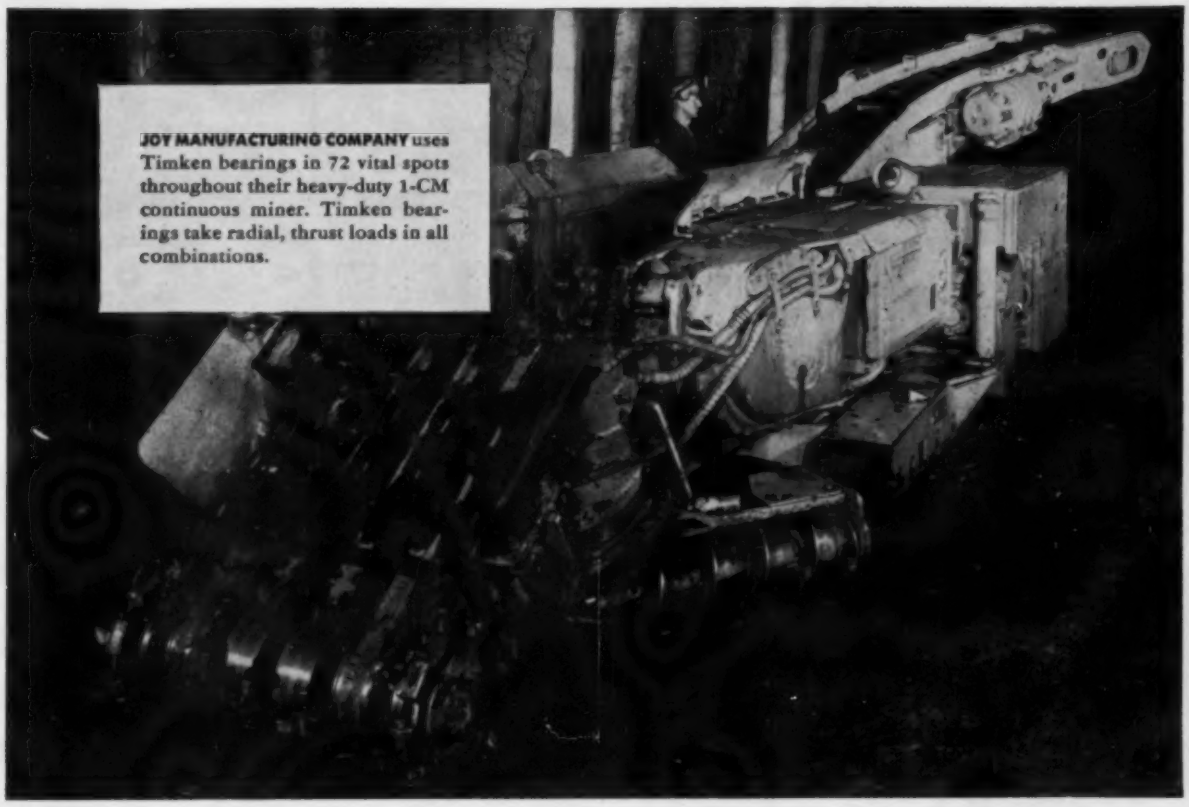
Oil stays clean longer, too—Chevrolet truck V8's and 261-cu.-in. 6's come equipped with modern high-capacity oil filters (V8 filters are of the Full-Flow type). These engines keep *clean* oil flowing to moving parts; parts wear less and last longer because of it!

Even the air is cleaner—Dust and foreign matter in the air an engine "breathes" can reduce engine life by years. Chevrolet minimizes this wear-producing factor by providing big oil-bath air cleaners as *standard equipment* on all truck engines.

These are sound under-the-hood reasons why a Chevrolet truck will *stay* on your job and *save* on your job. There are others, too, including short-stroke V8 design (shortest stroke of any truck V8's!) and 6-cylinder engine design that puts out more power than any other in the field. You'll learn about them all when you visit your Chevrolet dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Biggest sellers . . . because they're biggest savers!

CHEVROLET TASK·FORCE 57 TRUCKS


JOY MANUFACTURING COMPANY uses Timken bearings in 72 vital spots throughout their heavy-duty 1-CM continuous miner. Timken bearings take radial, thrust loads in all combinations.

Coal mine production jumps for joy—when TIMKEN® bearings roll up 17,818 tons in a month

USING Joy Manufacturing Company's 1-CM continuous miner, a West Virginia mine—in a regular month of operation—brought up 17,818 tons of raw coal. This was an average shift production of 457 tons, and an average production *per man-shift* of 53.8 tons . . . a 40% increase over conventional methods. Built for heavy-duty operation and high-tonnage production, the Joy 1-CM keeps rolling up record production with Timken® bearings in *72 vital spots:* idler head, speed reducer clutch, power take-off, crawler assembly, scroll drive, bar gear case, pump drive reducer, etc.

Tapered construction lets Timken bearings take heavy radial and thrust loads in all combinations. Full line contact between rollers and races gives extra load-carrying capacity. Rollers and races are case-carburized, with hard, wear-resistant surfaces over tough, shock-resistant cores—take tremendous shock loads. Timken tapered roller bearings make closures more effective by holding shafts concentric with housings. This means dirt, coal dust, water are kept out while lubricant stays in.

Friction is practically eliminated. Timken bearings are geometrically designed to give true rolling motion, and precision-made to do exactly that in service. We go one giant step beyond all other American bearing makers in quality control—we make our own steel. Design, precision-manufacture, rigid inspection and control of quality from melt shop to finished bearing all mean you get the finest when you specify "TIMKEN" on every bearing!

The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

See us at the 1957 COAL SHOW
May 13-16, Public Auditorium, Cleveland, Ohio
BOOTH NO. 900

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

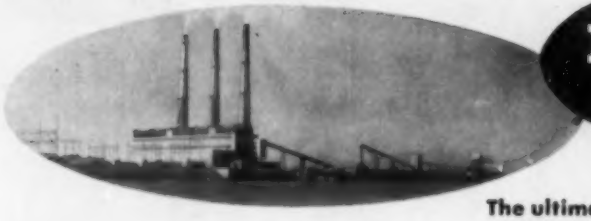
TRADE-MARK REG. U. S. PAT. OFF.

Cost conscious coal men are asking...

What is the day-in, day-out haulage cost per ton?

FULL LOADS

CLEAN DUMPING—STURDY CONSTRUCTION



Let's look at *all* elements of mine car cost—investment per ton of payload, haulage (power) costs, maintenance (wheel or rim replacements, for example)—all in terms of cost per ton mile.

Differentials lead the industry!

It's no secret! The Differential Axless truck design is the answer. For any given length, width and height car you can load more tons of coal than in any competitive make! We would like a chance to prove it—under *your* terms, using *your* slide-rule, *your* conditions. Hundreds of operators have seen the light. That's why we're busy, *real* busy, making *good* mine cars!

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FINDLAY, OHIO

The ultimate buyer is interested in your answer

Du Pont NILITE* for safer, powerful, low-cost shooting in dry work!

"Got any medium or large diameter dry holes to shoot? Man, if you don't use me, you're just plain wastin' money! Me? I'm NILITE: Du Pont's new ammonium nitrate blasting agent. Just pour me alone in easy shooting holes or as a top load in medium-hard ones. You'll get excellent spreading action, thanks to my over-60% weight-strength—and believe me, my price tag's low!

"Your work'll be safer, too. Caps, friction, shock and Primacord don't affect ol' NILITE. I'm also non-headache-producing, so your men can load faster, with an extra margin of safety. (For maximum safety, initiate me with Du Pont's "Nitramite®" Primer, although explosives of at least 50% strength can also do it.)

"I come two ways: in non-expanding round burlap-asphalt bags of 7", 8" and 9" dia. (larger sizes on request) for loading directly into holes—and bulk-packed, in 50- and 100-lb. multi-wall paper sacks that resist tearing and abrasion, for pouring into holes.

"Cut shooting costs—get all the power you need—by using me. That's NILITE: another field-tested Du Pont product you can bank on!" Call our man or write: E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

*Registration applied for.

See us at Booth No. 214, American Mining Congress 1957 Coal Convention, May 13 to 16, Cleveland, O.

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DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Foreign News

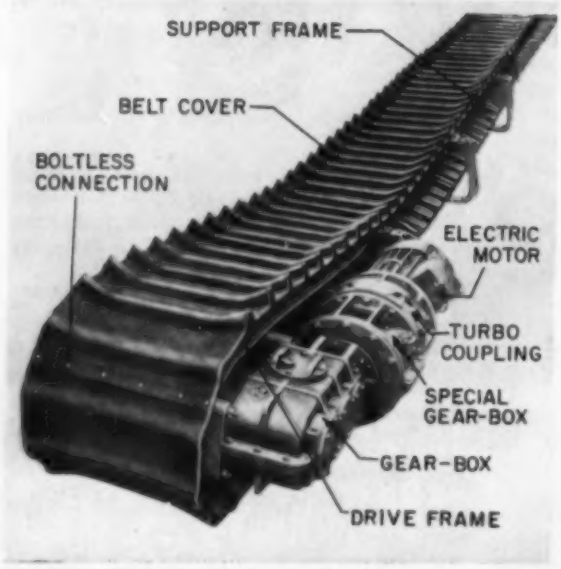
GERMANY

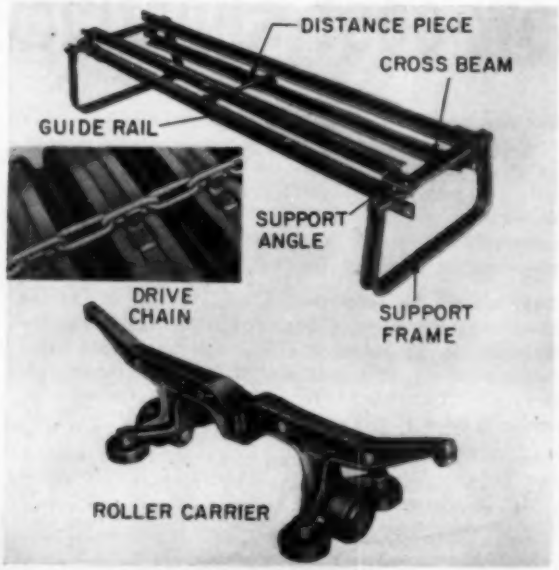
A snaking conveyor belt that climbs, twists, and turns in three-dimensional maneuvering is being manufactured by Gewekschaft Eisenhuette Westfalia, Wethmar, Post Lunen, Germany. The conveyor's rubber belt, which is folded at spaced intervals and vulcanized on to trough-shaped steel cross-ribs, negotiates curves and spirals with a radius as small as 10 ft. At the same time the belt will climb a grade of 30 deg against a load.

The manufacturer declares that the conveyor has a number of advantages over standard conveyors. Flat or curved rubber belts, it is pointed out, can run only in straight or inclined horizontal directions. Further, they require another belt beneath the first conveyor to change direction. The German belt, says the maker, will decrease power needs and costs, since no second drive or transfer chute is needed. And, neither will there be a loss of height at transfer points.

The belt's steel cross-members are fastened to die-forged roller carriers, each of which is designed with two horizontal guide rollers and one vertical carrier roller that run the U-shaped track of the conveyor trestle. An electric motor, or air turbines, drives a steel chain fastened to the centers of the folded cover sections to move the belt. The ability of the folded belt to compress and extend at the folds makes it possible for the conveyor to negotiate three-dimensional curves. At the chain sprockets, for example, the folds are almost completely extended. The company manufactures the conveyor for

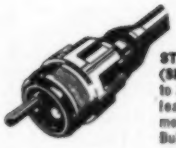
SNAKING CONVEYOR designed by German manufacturer will handle 261, 326 and 395 cu yd per hr at speeds 2 ft 8 in to 4 ft 6 in per sec.



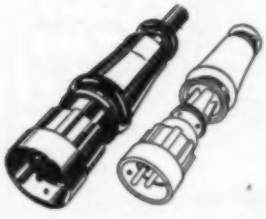


DESIGN FEATURES of conveyor include ribbed belt, boltless belt connection, drive chain. Manufacturer says the unit will climb a 30% grade against load.

THIS CONNECTOR HAS TO BE *Tough!*



STRAIGHT PIN BIGUN (SPB) styles are molded to 36" (Or as specified) leads. Have threaded metal couplings. Ask for Bulletin B39a.



"QUIK-LOC" styles attach quickly to your cable. New-type couplings engage or disengage in ¼ turn. Ask for Bulletin B57.

IT IS! It's a Joy Connector . . . a non-corrodible, moisture-tight electrical coupling with a rugged coat of flame-resistant, shatter-proof, distortion-resistant Neoprene. Soak it in water, hit it with a sledge, drag it through oil . . . it'll take that and more.

Joy plugs and receptacles are built for long, maintenance-free service under the most adverse conditions. They're produced in styles and sizes to meet every need . . . for both AC and DC applications. "SPB" and "Quik-Loc" designs are available with pilot control contacts for *permissible operation* with Joy's Bureau-of-Mines-Approved distribution centers (SCC units).

For details, write *Joy Manufacturing Company, Electrical Products Division, 1201 Macklind Avenue, St. Louis 10, Missouri.* Executive Offices: *Oliver Building, Pittsburgh 22, Pennsylvania.*

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Foreign News (*Continued*)

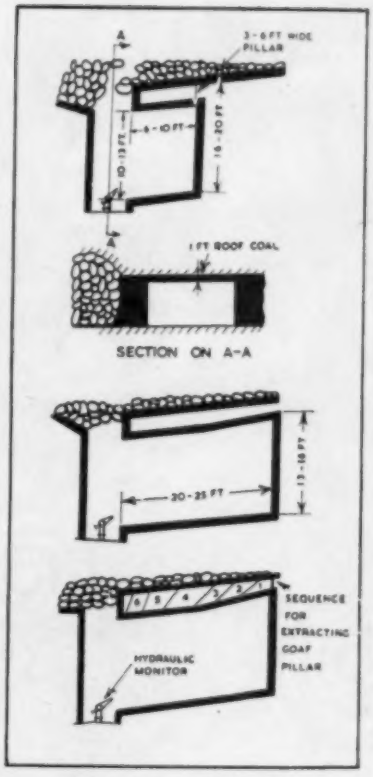
capacities of 261, 326 and 395 cu yd per hr.

The conveyor's driving power depends on requirements. Its main drive can be equipped with one or two drive units. The return unit can be either an auxiliary drive or merely a chain sprocket without a driving unit.

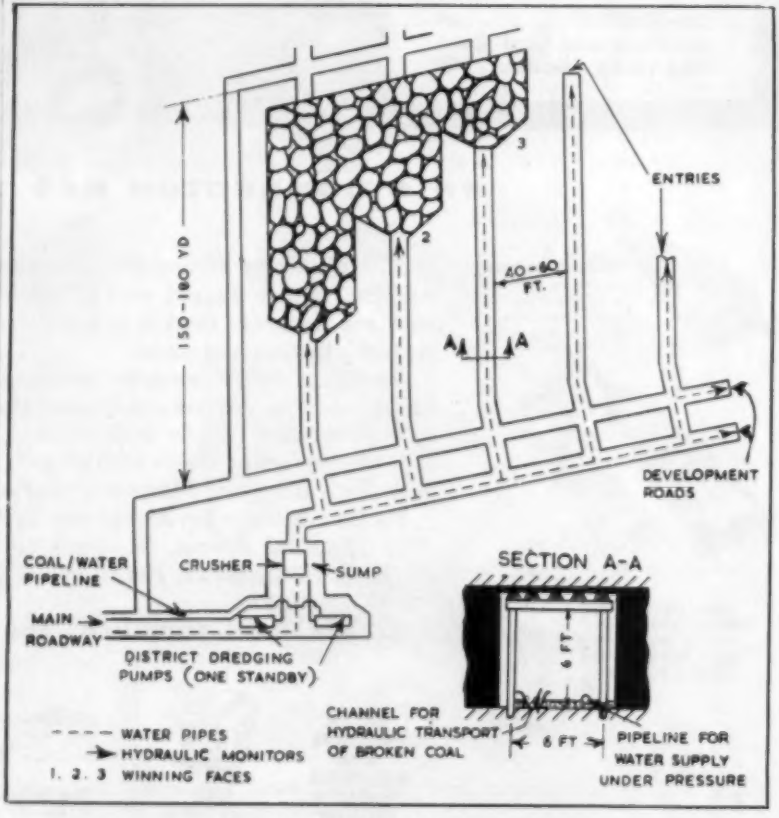
USSR

Hydromechanization is the term which most aptly describes the latest Russian attempts to increase output per man shift in the mines of the USSR. It is claimed that with hydraulic mining three- to five-fold increases in productivity can be achieved. The method consists of preparing the pillars by long-hole pulsed infusion (see *Coal Age*, February, 1957, p 88), then breaking out the loosened coal by a high-pressure jet of water. The water and coal flow away in steel flumes laid in the entry floors.

This unusual method of mining, described in a report by a British NCB technical mission after a visit to Russia's Kuzbass, Donbass and Rostov coal fields, was observed in an 8-ft-thick seam inclined at 6 deg. Two drifts 1,650 ft long at a gradient of 1 in 8 provide access to the working panel shown in the diagram. Two development openings are driven in the seam at a gradient of 1 in 400, and from these production



Pillar-extraction sequence



Panel layout for hydraulic mining

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SINCLAIR SUPER TENOL MOTOR OIL

The RIGHT Answer to Your BULK STORAGE Needs:

MARIETTA CONCRETE SILOS

Coal storing and handling becomes simplified, efficient and economical when you have a MARIETTA storage system engineered to your operation.

Marietta silos are economically erected in any desired capacity . . . any number of units. Interlocking concrete stave construction provides safe, dry storage . . . resists wind, shock or fire . . . requires a minimum of maintenance.

Conveyors, feeders, discharge systems or other auxiliary equipment for your particular material handling requirements can be mounted on the sturdy walls of a Marietta silo.

Depend on Marietta's 41 years of experience to design and erect the most efficient storage system for your need under one cost-saving contract. No delays due to critical material shortages with a Marietta installation . . . erection is quickly and efficiently handled by factory trained personnel.

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THE Marietta CONCRETE CORPORATION Marietta, Ohio

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Foreign News (*Continued*)

openings are driven 40 to 60 ft apart on the full pitch of the seam to define the pillars to be recovered on retreat.

The pillars are extracted in lifts from 15 to 20 ft long by directing the jets from hydraulic monitors against the previously loosened coal faces. The water and coal flows away in the steel flumes. About 1 ft of roof coal is left to provide support and a pillar from 3 to 6 ft thick is left against the gob while the main part of the lift is recovered. The final step involves recovering as much as possible of the roof coal and the thin gob pillar. Then the next lower lift is attacked.

Average losses due to premature caving and so on amount to about 20% of the original coal. No track is laid in the openings, although a simple form of monorail is suspended from the roof for transporting supplies.

All seams are assigned a hardness factor, F, and it is calculated that a minimum pressure of 50F atmospheres is required to remove the coal without prior shooting. At the mine visited by the British experts the hydraulic circuit included four pumps, two operating at a time, delivering at a pressure of 40 atmospheres through 9.8-in diameter pipes to the pit bottom. Pipes in the underground roads to the bottom of the entry roads are 7.8 in and in the entry roads up to the monitors 3.9 in. Pressure at the jet is from 38 to 42 atmospheres at a fluid velocity of from 260 to 390 fps.

The water and coal mixture flows back to a 350-cu ft sump, first passing over a bar screen and hammer mill which reduces all coal to minus 60mm (2.36 in). The mixture is pumped from the bottom to the preparation plant. Flushing points are provided every 45 ft for use in the event of blockages and it is estimated that pipe changes will be required only after 500,000 tons have ben transported.

The system discharges into settling tanks on the surface. The overflow water is recirculated and the thickened coal is conveyed to the cleaning plant.

The NCB technical mission points out that the system is likely to revolutionize mining under certain conditions and every effort is being made to exploit its possibilities. One drawback is the muddy condition created by the large volumes of water, but the Russians had laid duckboards as walkways in the entries.

Major factors to be considered in hydraulic mining are:

1. Coal Hardness—Soft coals are preferable but much can be done using pulsed-infusion shotfiring with harder coals that are well cleated.

2. Thickness of seam — Moderately thick veins are preferable but one of the new collieries to be "hydromechanized" will work a seam 25½ in thick.

3. Depth of workings — The large quantities of water together with the fact that the mining method is essentially room and pillar necessitates operating at comparatively shallow depths. Depth of cover at the mine visited by the technical mission was 200 ft. (*Continued*)

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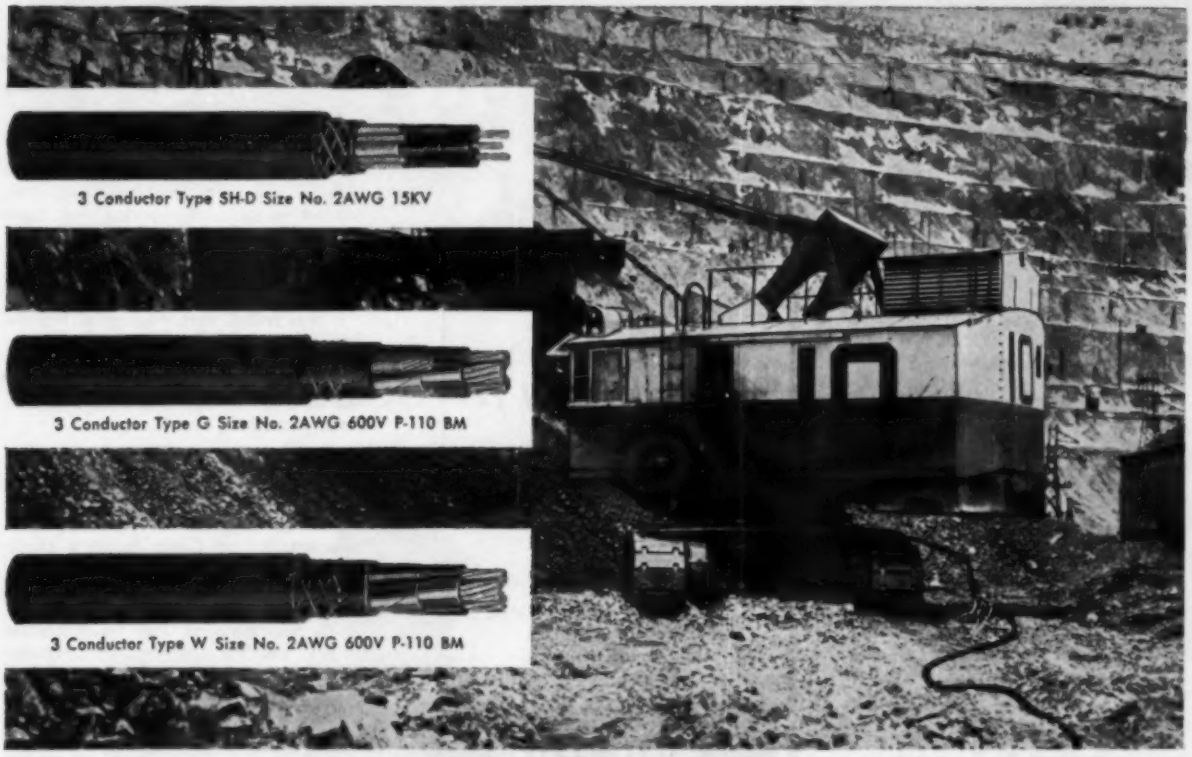
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3 Conductor Type G Size No. 2AWG 600V P-110 BM
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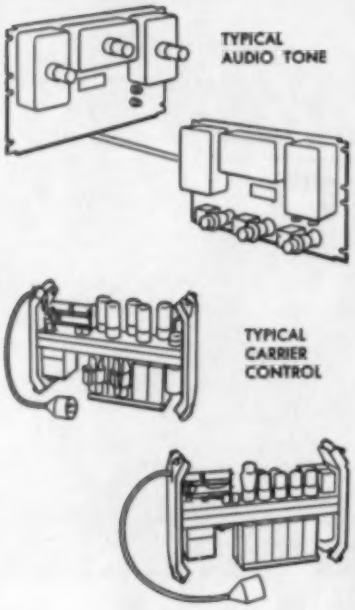

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FEMCO TROLLEYPHONES AND AUDIOPHONES

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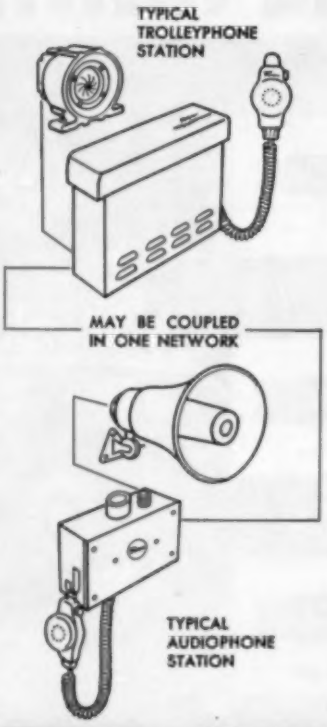

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Foreign News (*Continued*)

4. Seam gradient—Consistent though slight gradients are essential for ease of working. Undulating measures would create considerable difficulty.

5. Nature of floor and roof—A good roof and floor is preferable although conditions in the Russian mine were not particularly good. The point was to try the hydraulic method in less-than-average conditions.

At one Russian colliery an experiment in hydraulic mining has resulted in a productivity of from 12 to 15 tons per man shift. The system is now passing from the experimental stage to that of wide-scale application with plans for 59 more installations in the works.

In other phases, it was observed that method study was employed at all collieries visited by the British team and that technically well-founded standards of production had been worked out in relation to conditions. And on educational facilities, the equipment of schools and colleges provided by the Ministry of Coal Industry was on a generous scale. The number of students moving out each year into coal mining is about 4,000 graduates of university standards and 13,000 on a level approaching British certificate standards.

It was noted, even in central Siberia, that current foreign technical publications were available and the ministry employed a considerable staff to abstract and translate foreign information for use down to colliery level.

GREAT BRITAIN

The development of hydraulic coal transportation at Great Britain's Markham Colliery (*Coal Age*, March, 1957, p 138) has advanced another step with the replacement of a 6-in pipe with one 10 in in diameter. The transportation project, which was spurred by a disaster caused by an overheated conveyor belt at Creswell Colliery in 1953, is successfully conveying coal from the mine head to the washery plant, a distance of 1,000 ft. The coal moves up an incline of 1 ft to every 150 ft of travel. Not only has the original 6-in pipe been replaced with a larger one, but throughput has been boosted to 150 tph of minus 3-in coal.

Loading has been accomplished by a conventional Gwynnes solid handling pump. The throughput is discharged to the pit. An elevating dredger raises the solids to the washery and the water is returned to the input side of the system.

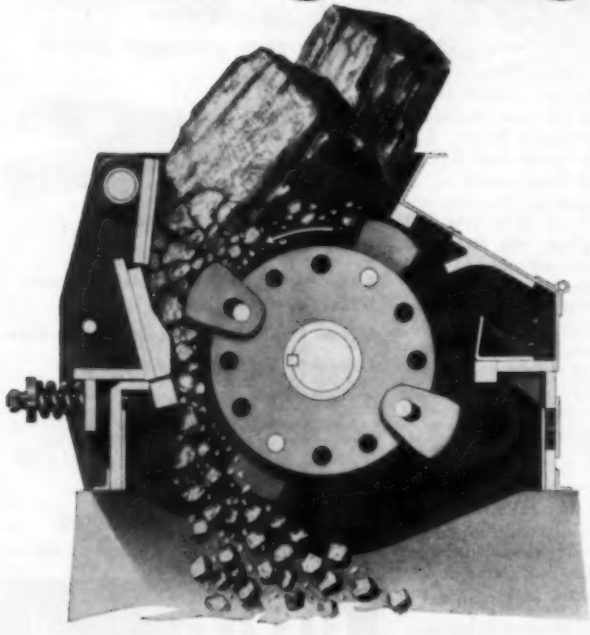
Only recently the solids handling pump was replaced with a lock hopper system designed by the Ministry of Fuel & Power. Coal is loaded into one of two vessels. The vessel is pressurized by pressure from the hydraulic pipe line. The coal then falls through a pressurized reservoir—held at the same pressure—into the pipe line. The second vessel is loaded while the other is discharging.

The National Coal Board will export some 7 million tons of coal, excluding

To keep mine refuse moving freely,

reduce it with a **JEFFREY**

Heavy Duty Slugger CRUSHER



Among features which give ruggedness to this crusher are heavy-duty rotor with large diameter hammer pins, all-welded steel construction frame, and heavy renewable manganese liners.

THE Jeffrey Heavy Duty Slugger Crusher reduces large rocks and refuse from full seam mining to a size that can be readily handled on a belt conveyor. The resultant sized product greatly decreases the possibility of spontaneous combustion at the dump.

This crusher is, in effect, a high-speed single roll unit, although the crushing is done entirely by impact. Hammers weighing 100 to 150 pounds each hit the rock and waste with sledge hammer blows. Feed ranging up to 54" square x 24" thick (in the 42" x 66" size crusher) can be reduced quickly to almost any sized product between 8" x 0" and 3" x 0".

For every coal crushing problem, write for Bulletin 784-C to assist you in selecting the proper machine. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

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Foreign News (*Continued*)

bunkers, this year. The bulk of exports will go to Ireland, Scandinavia, and countries of western Europe. Last year 8½ million tons were exported, earning $126 million for Britain. Some 5½ million tons were imported, more than half from the United States, at a cost of $121.5 million.

BRAZIL

The Brazilian state of Santa Catarina, one of the country's coal producing states, will get a 100,000-kw thermal electric plant for Capivari, a community situated in the coal producing area. Financing and administering will be under the control of the federal government, the state government, the National Steel Mill, and an association of coal miners. Behind the project is Brazil's economic need to market its secondary coal—coal that remains after the coking product has ben used by the National Steel Mill. Brazil's government, traditionally more concerned with hydro power than with thermal power to generate electricity, has now begun to build a broader base of thermal electric plants, not only to build its secondary coal market, but to provide power during low water cycles and in areas unserved by hydro. Santa Catarina coal is not high quality, but is used for coking after being mixed with imported coking coal. The process, however, is expensive unless the coal remaining after processing can be sold. As a result coal production is held down. But, if an electrical energy market can be created to consume secondary coal, increased production of primary coal for steel will become economical.

Last year Brazil's coal production was approximately 2.3 million metric tons. With the installation of new thermal-electric plants in southern Brazil, the government hopes to boost that figure substantially. Already functioning is a 20,000-kw thermal plant in the state of Rio Grande do Sul at Sao Jeronin. Another 20,000-kw plant will be completed this year in Rio Grande do Sul. And still another—this one with a capability of 54,000-kw—is under construction. The three coal producing states are Parana, Santa Catarina, and Rio Grande do Sul. Only in Parana is there no actual construction, but studies are being made to set up a 20,000-kw unit in the southern part of the state.

Brazil imports most of its coal from the United States for steel production. The coal fields were used to supply railroads, but this market is rapidly diminishing as railroads turn to diesel power. This was the chief reason for the Brazilian secondary coal market slipping away.

And, as the market slipped it became too expensive to mine primary coal for steel production only. The result is the government's National Coal Plan, which calls for the construction of a series of thermal-electric power stations, the biggest being the 100,000-kw station in Santa Catarina.

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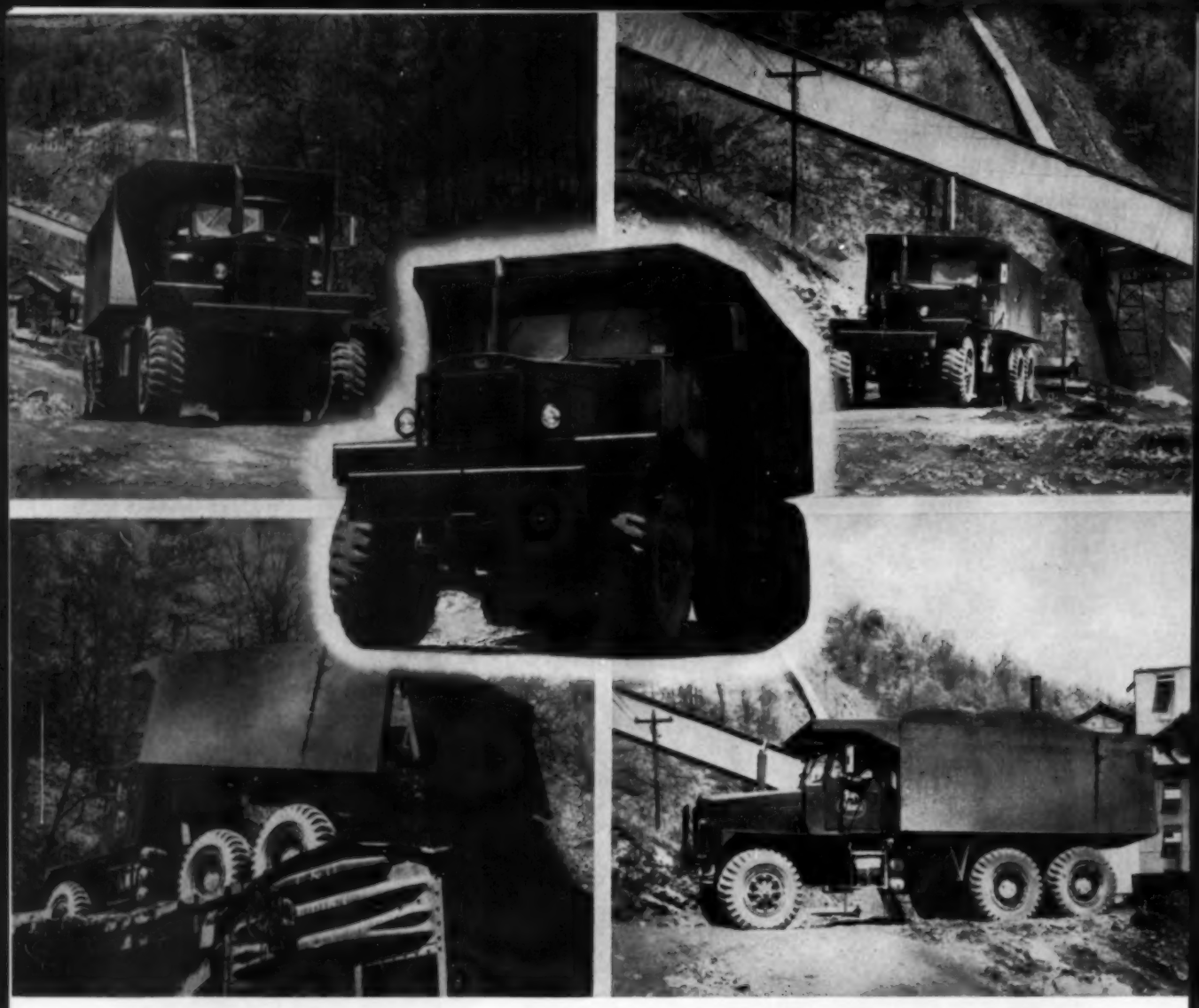

P. H. Aliff, owner of these coal-hauling Mack LRSW's, says, "These big dumpers are really producing for me around the clock—hauling twice as much as my old units." Like other operators, Mr. Aliff has discovered that . . .

Big trucks bring big savings in hauling costs

A contract hauler for The Red Parrot Coal Company in Prenter, West Virginia, Mr. Aliff was using small, gasoline-powered dump trucks. With these trucks, he experienced the expensive maintenance, fuel, and down-time costs that are normal with undersized equipment.

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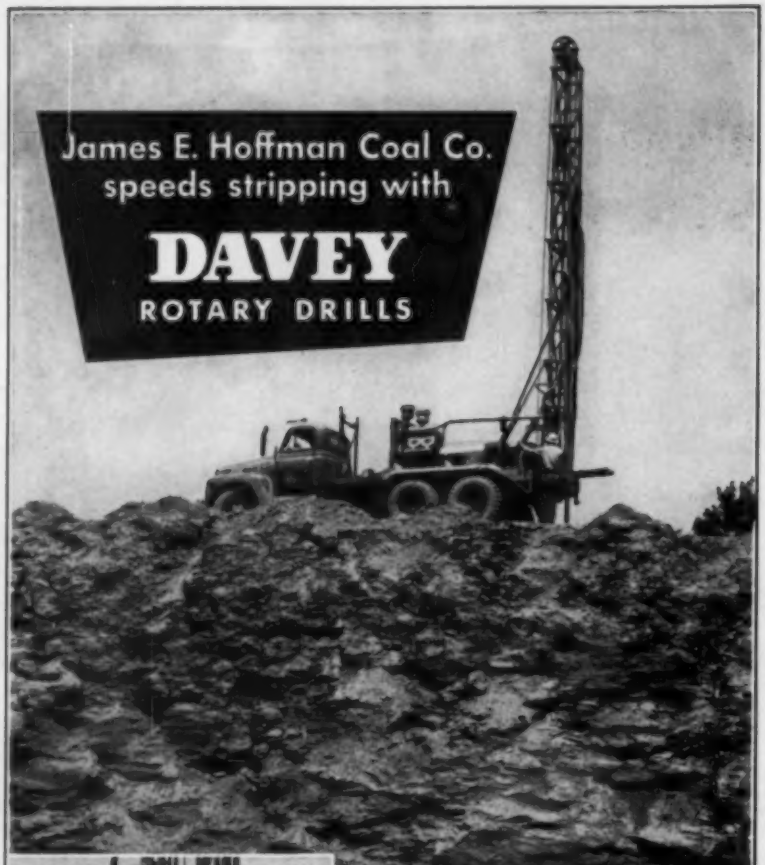

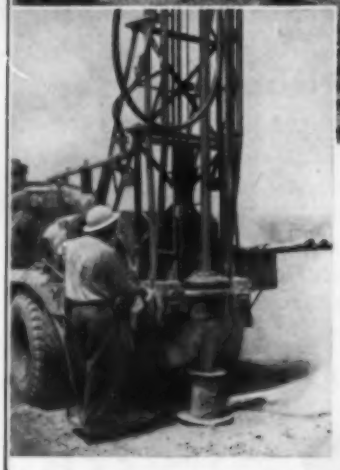

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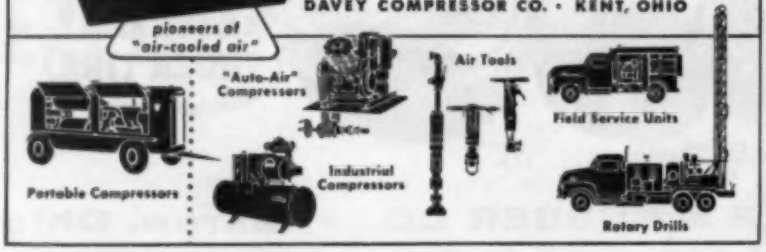

Personal Notes

Division Heads Named

After creating four operating divisions encompassing its mines in West Virginia, Virginia, and Tennessee, the Pocahontas Fuel Co. last month appointed five high level operating officers to run the divisions.

The top job went to **Marvin E. Hall,** who was appointed to the newly created position of assistant general superintendent. Division superintendent of the Amonate and Bishop mines in West Virginia since December, Mr. Hall is an old Pochontas Fuel employee who accumulated experience first as a foreman at Amonate and Bishop, and as a federal mine inspector.

For each of its new divisions Pocahontas named a division superintendent. At Amonate and Bishop, **Grover L. Asbury,** superintendent of the company's Itmann mine in West Virginia, was named division superintendent. From the Boissevain mine in Virginia, Pocahontas took **Jack Goodwin** for division superintendent of the Crane Creek, Piedmont, Rolfe, and Peerless mines in West Virginia. From his job as superintendent of the Jenkinjones mine in West Virginia, **Daniel C. Tabor** was made division superintendent of Jenkinjones, Angle, and Boissevain mines. The fourth and final divisional appointment went to **Irwin M. Sampson,** who will supervise the Deerfield and Itmann mines in West Virginia, and the Morco and Trimore mines at Devonia, Tenn.

To fill the vacancies created by the divisional-level appointments Pocahontas Fuel appointed the Itman mine's assistant superintendent, **Michael M. O'Brien,** to fill Mr. Asbury's job as superintendent. Replacing Mr. O'Brien as assistant superintendent is **Joseph B. McClellan.**

At Jenkinjones **W. B. Coburn,** assistant superintendent, was moved up to superintendent to succeed Mr. Tabor. Only in Tennessee, where Mr. Sampson had been superintendent of Pocahontas Fuel's mines, was the vacated job of superintendent left vacant.

Shelby Tolliver, formerly superintendent of the Rolfe mine, Worth, W. Va., and assistant superintendent of the Peerless mine, Vivian, W. Va., was appointed superintendent of Peerless.

John W. McGinn was elected president of the Sterling Coal Co., succeeding the late Col. Robert B. Baker. Mr. McGinn served for many years as executive vice president of Sterling.

J. W. Pero was appointed Pocahontas Fuel Co.'s assistant vice president of operations. His former position as the company's director of safety and mine inspection is being filled by **Louis Roncaglione.** Mr. Pero joined Pocahontas in

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Personal Notes (*Continued*)

1943 as a safety engineer. Later he was employed as production manager. In September, 1955 he was appointed director of safety and mine inspection. Before employment with Pocahontas he had been associated with the Hudson Coal Co., in anthracite, and had been senior safety instructor and assistant mining engineer with the U. S. Bureau of Mines from 1936 to 1942. Mr. Roncaglione has been an officer of Pocahontas Fuel for a number of years. He was superintendent of the company's Amonate mine before assuming the duties of mine inspector, the post he leaves for the safety director job.

John E. Bowman resigned as president and director of the Utilities Elkhorn Coal Co., Pikeville, Ky. His resignation ends 35 yrs of association in coal mining. Mr. Bowman became associated with Utilities Elkhorn Coal in 1928. In 1948 he was elected president of the company. He became a major stockholder in 1951, and its principal stockholder in 1955.

Maurice Messersmith, Benton, Ill., was appointed safety engineer for the Bell & Zoller Coal Co.'s mines at Zeigler, Buckhorn, and Murdock in Illinois, and the

Oriole and Moss Hill mines in western Kentucky. Mr. Messersmith has served the U. S. Bureau of Mines as an inspector since 1952. Before that he had been with the Union Pacific Coal Co., Rock Springs, Wyo., for 17 yr.

Patrick C. Graney, Sr., vice president of the Sterling Smokeless Coal Co., Whitby, W. Va., was appointed West Virginia's road commissioner. The appointment was made by the state's Governor Underwood. The appointment is for a 4-yr term. Mr. Graney, a resident of Mt. Hope, W. Va., has been a coal executive for a number of years. He was general manager of the C. C. B. Smokeless Coal Co. for 14 yr, and president of the Gulf Mining Co. from 1940 to 1956.

Donald Markle, Jr. was elected a vice-president of the Jeddo-Highland Coal Co., Jeddo, Pa. Mr. Markle, Jr., the son of Jeddo-Highland's president, **Donald Markle,** worked for the Stonega Coal Co. before joining his father's company. Beginning as an assistant mine foreman 5 yr ago, he has moved to general superintendent since.

Erwin F. Eckhardt, Pratt, W. Va., was named manager of coal mining for the American Gas & Electric Service Corp. Mr. Eckhardt, superintendent of the Morris Creek mine of the Central Appalachian Coal Co., assumed his new position in April. **R. E. McLaughlin,** former resident engineer at Morris Creek, succeeded Mr. Eckhardt as superintendent. Mr. Eckhardt had been superin endent since 1948. Prior to that he had been associated with Eastern Gas & Fuel Associates in Boone County, W. Va., and with Kopperston in Wyoming County.

Frank S. Scott was put in charge of the Bituminous Coal Institute's District No. 5, De roit, Mich. Mr. Scott succeeds **J. K. Goodwin,** who resigned to join the Norfolk & Western Ry. Mr. Scott is an engineering graduate of Syracuse University and the University of Michigan. He was formerly on the engineering staffs of the Detroit Edison Co., General Motors Corp., U. S. Rubber Co., and the Hudson

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Personal Notes *(Continued)*

Motor Car Co. He also was fuel engineer for Appalachian Coals, Inc.

R. C. Flegal, a former associate of the Bituminous Coal Institute's Philadelphia office, was appointed to head a new district office at Buffalo, N. Y. Mr. Flegal is a former Reading Anthracite employee.

Obituaries

Karl T. Miller, 62, for 45 yr and employee of the Hudson Coal Co., Scranton, Pa., died in Scranton April 5. A former president of the company's Safety Engineers Club, Mr. Miller had held the post of safety engineer at Hudson Coal for 10 yr.

E. L Jarroll, 63, Lockwood, W. Va., died April 7 in Charleston, W. Va. Mr. Jarroll was president of the Line Creek Coal Co., and vice president of the Gray Eagle Coal Co., both Lockwood.

MEETINGS

AMC, Coal Show, May 13-16, Public Auditorium, Cleveland, Ohio.

2nd Annual Appalachian Underground Corrosion Short Course, June 4-6, West Virginia University, Morgantown, W. Va.

National Coal Association, Annual Convention, June 4-6, Hotel Shoreham, Washington, D.C.

Open Pit Mining Association, Annual Meeting, June 20, University of Illinois, Urbana, Ill.

Rocky Mountain Coal Mining Institute, Annual Convention, June 23-26, Hotel Colorado, Glenwood Springs, Colo.

International Briquetting Association, Biennial Conference, Aug 19-21, Colorado Hotel, Glenwood Springs, Colo.

9600 HOURS WITHOUT DOWN-TIME

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This high-powered 2-cycle engine accelerates rapidly—responds to load instantly. It delivers a smooth, steady power output—twice as many power impulses for each revolution of the crankshaft. It starts quickly. Its clean, simple design makes maintenance much easier. And parts and service are readily available when needed.

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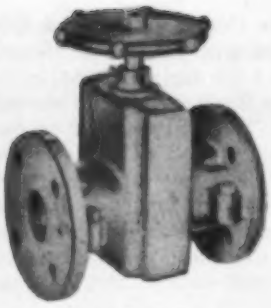
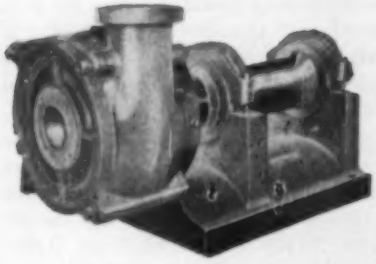
A GM Detroit Diesel "6-110" powers 4-yd. dragline owned by Old Hampshire Coal Co., Keyser, W. Va.



VALVES



PUMPS

TABLECOVER

BALL MILL FEED SCOOPS

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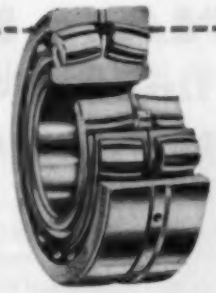
LEARN

...HOW SKF CAN HELP YOU

At the American Mining Congress Coal Show, Cleveland Auditorium, May 13 to 16, SKF will display the world's finest, most extensive and versatile assortment of anti-friction bearings. Here are just a few of the high spots of interest:



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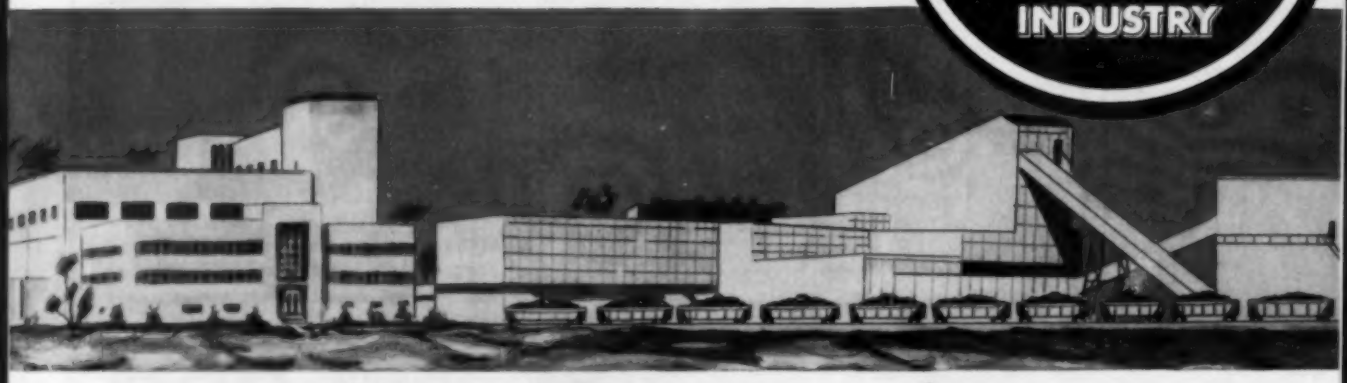
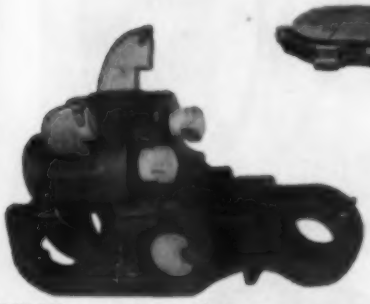


Cincinnati Cutter Bar Assembly Available For Any Cutting Job.



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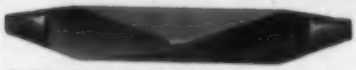
STANDARD KERF TRIMMING CHAIN for use on boring type Continuous Miner. Sturdy, rivetless type construction.

CINCINNATI DUPLEX CHAIN AND BIT is recommended for maximum cutting efficiency and for use on all types of cutting machines.



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TRANSPORTATION—A. L. Lee (left), Pittsburgh Consolidation Coal Co.; William Hanson, Joy Mfg. Co.; Norman Long, Goodman Mfg. Co.; J. W. Stevenson, Jeffrey Mfg. Co.; R. F. Knobloch, U. S. Rubber Co.; Placide Mayeur, retiring president of the Indiana Coal Mining Institute and meeting chairman.

CONTINUOUS MINING—C. Ward Padgett (left), Bell & Zoller Coal Co.; George Stachura, Old Ben Coal Corp.; Eugene Stacey, Enoco Collieries, Inc. They discussed both operation and maintenance.

SAFETY—William McCullough (left), Snow Hill Coal Corp.; F. J. Smith, U. S. Bureau of Mines; A. G. Gossard, Snow Hill Coal Corp.; Howard T. Batman, Lynch Coal Operators Reciprocal Association; and Charles A. Purcell, Indiana Dept. of Mines and Mining.

INDIANA OFFICERS—E. M. Cassidy (left), Snow Hill Coal Corp., vice president; Colvin B. Burk, Viking Coal Corp., president; Ethel L. Morgan, secretary-treasurer; Carl A. Donie, Farview Collieries Corp., vice president; and Eugene Stacey, Enoco Collieries, Inc., vice president.

Indiana Institute Surveys Mining and Safety

Shuttle-car and belt haulage, production with various types of continuous miners, problems in miner maintenance, and ways and means of resuming safety progress discussed at Indiana Institute sessions.

TRANSPORTATION, continuous mining and safety were the key topics at the 1957 meeting of the Indiana Coal Mining Insti ute, Terre Haute, Ind., April 13. At the business session, the institute elected officers for the coming year as follows:

President—**Colvin B. Burk**, general superintendent, Viking Coal Corp., Terre Haute, succeeding **Placide Mayeur**, superintendent, Princeton Mining Co., Princeton, Ind.

Vice Presidents—**Carl A. Donie**, Fairview Collieries Corp.; **E. M. Cassidy**, Snow Hill Coal Corp.; and **Eugene Stacey**, Enoco Collieries, Inc.

Secretary-Treasurer—**Ethel L. Morgan.**

Executive Board—**James Guiney**, Highway Machine Co.; **Ralph Whitman**, Ingle Coal Corp.; **H. P. Roberts**, C. F. Gharst Supply Co.; **Charles Adams**, Kennametal, Inc.; **Nathaniel Kirk**, Snow Hill Coal Corp.; **T. E. Davis**, Jeffrey Mfg. Co. and **Mr. Mayeur.**

AC SHUTTLE CARS

Leading off a group of five speakers on transportation and transportation equipment, **A. L. Lee**, A. L. Lee Engineering Div., Pit sburgh Consolidation Coal Co., Columbus, discussed the application of AC power to shuttle-car transportation, with particular emphasis on the Torkar design incorporating a torque-converter into the power-transmission system.

Simplicity, low first cost, low maintenance, lower-cost controls, a simpler more-efficient power system and a usually smaller motor for the same horsepower are among AC advantages. Disadvantages include lower overall torque compared to the DC traction motor, higher starting current, a tendency to overheat quickly under sustained overload, lower full-load torque with the exception of one AC type, and torque varying with the square of the voltage, thus requiring good voltage.

AC thus could serve on level hauls but if geared directly to the wheels would be impractical on grades over 40% of those that could be negotiated with DC. By installing a torque converter and three-speed transmission, however, the AC motor characteristics become assets. Total current for maximum performance is cut materially, more severe grades can be negotiated because the motor horsepower is used more efficiently, regenerative braking is available without special auxiliaries, the motor can be used to power auxiliaries since it is not directly connected to the wheels, the delivered torque is about 1⅓ times that from a direct-connected DC motor and at the same time the stall amperage ratio is 1:3 in favor of the Torkar sys em, three-speed provides low-speed high-torque maneuvering without jogging, and the car can negotiate grades as follows: high gear, 10%; 2nd gear, 15%; low gear, 45%. Cable, in fact, Mr. Lee concluded, is about the only problem of any note with the AC car.

MOBILE BELTS

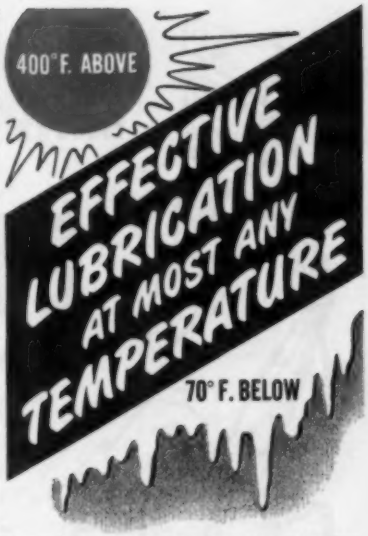
Coal has a good future, noted William Hanson, manager, conveyor products, Joy Mfg. Co., New Philadelphia, Ohio, in opening a discussion of extensible belts, but that future would be jeopardized if costs cannot be kept down. One way is the use of mobile belt units. Joy has sold over 80 extensible belts, or over $5 millions worth, and the last 15 were repeat orders. The reason is that when an extensible belt is combined with a high-capacity miner and the combination is properly operated, tons per shift go up about 50%. Low maintenance is an outstanding by-product of the use of this type of equipment.

Stressing the design, use and advantages of Limberoller sections and Limberope conveyors, including fast installation—as much as 1,000 ft of Limberoller sections can be placed in 4 hr by two men—Mr. Hanson pointed out that a number of modifications and new designs will expand the use of this type of equipment. One new development is the 90-deg belt turn, which opens up new opportunities for flexibility in continuous mining with belt haulage.

Summing up, he listed mobile belt advantages as the nearest thing yet to continuous transportation, plus simplicity and reduced installation time, lower maintenance, less loss of time in moving, and lighter belts. But units must be properly used, meaning trained operators, good maintenance, and capacity for the job.

ROPE BELTS

Early 1955, in Illinois, marked the first experimental Ropex conveyor, noted Norman Long, application engineer, Goodman Mfg. Co., Chicago. In discussing design features he observed that one of the first needs was to develop a chain-link idler for flexibility, which idler



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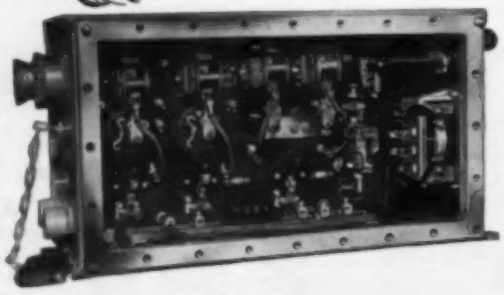

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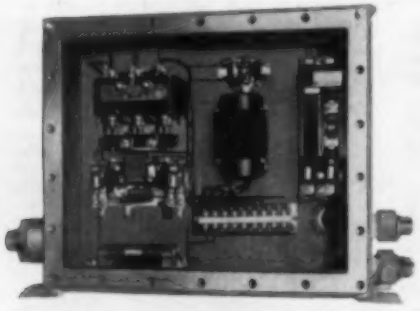
Reduced Voltage Starter

Sturdily designed and dependably built for smooth, efficient operation of belt conveyor systems and other heavy mine equipment. Three point acceleration—reversing, with reversing switch interlocked to prevent plugging—Bureau of Mines explosion-tested enclosure. 20-30 HP, 230 Volt D.C. capacity.



ENSIGN Bulletin 6320
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Indiana Institute (*Continued*)

also moves back and forth in the belt direction and thus cushions the shock as the load rides over.

Good installation is vital with ropebelts. Though easy training results from basic characteristics, these same characteristics can result in equally easy detraining if the conveyor is not properly installed. Alignment is especially critical. To date, rope belts are used in both high and low coal and in many types of non-coal mining. They have excellent possibilities for surface applications, Mr. Long also pointed out.

The latest extensible Ropex belt, Mr. Long continued, is designed for the Goodman 300 miner, and has a tramming height of 40 in. All-hydraulic control eliminates several motors and makes for compactness.

ARTICULATED CONVEYORS

Offering through still and motion pictures a detailed description of the Jeffrey Molveyor, J. W. Stevenson, sales engineer Jeffrey Mfg. Co., Evansville, Ind., pointed out that the goals in its development were continuous transportation and increased operating time for the face unit. Mobility and flexibility permit ready use in entry, room and other work, and make the Molveyor particularly adaptable to pillaring.

BELT FABRICS

Belt conveyors are relative newcomers to mining, said R. F. Knobloch, Midwest belting engineer, U. S. Rubber Co., Chicago, and in the early days the principal components were a rubber cover and woven cotton duck. Capacity and length were relatively low, and fabric weights were 28, 32 and 36 oz. In 1929, 42-oz duck was introduced, and in 1939 48-oz, in both instances for higher tonnage and greater belt lengths.

After World War II it became evident that even the heaviest standard cotton ducks would not provide the strength and flexibility to satisfy the troughing and training needs posed by modern equipment. Belt manufacturers therefore began to experiment with rayon, nylon and other synthetics and mixtures for high strength, good flexibility and a minimum of bulkiness, plus abrasion resistance, resistance to stretching to insure proper belt tension, and resiliency to absorb starting and stopping shock.

Weighing all possible combinations, U. S. Rubber introduced cotton-nylon fabric in 1948. After this first advance it became evident that other synthetics and combinations—rayon, cotton-rayon and rayon-nylon—were the answers to longer lengths and higher lifts. Experimentation is continuing on such fabrics as dacron, orlon and other new synthetics to stay abreast of the needs of modern mining equipment.

CONTINUOUS MINING

Leading off a panel on continuous mining at the second technical session, C. Ward Padgett, general superintendent, Illinois Div., Bell & Zoller Coal Co., Ziegler, Ill., described briefly experience

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Indiana Institute (*Continued*)

with two 4 JCM and two 1 CM Joy miners at Buckhorn mine. An earlier report on this work appeared in *Coal Age*, December, 1955, p 50. The No. 6 coal averages 8½ ft with a 1½-in band 18 in up from the bottom. Mining includes pillaring, with rooms and crosscuts on 72-ft centers. Two miners develop room sections and establish bleeder system. Pillars are moved by splitting and then taking lifts out of the half on the gob side, leaving small stumps to crush, and then repeating the process with the remaining half. A recovery of 85% is considered safe. Bolting is done where it is deemed necessary.

Two of the miners have been equipped with hydraulic roof-bolting units. Other practices which cut time losses include training other crew members to substitute. If the miner operator is off, limiting moving to between or off shifts, repair crew on third shift, and use of pickup loaders to keep miner operating and facilitate keeping places completely clean of loose coal. Shuttle cars (10SC) haul to 30-in belt which discharges to drop-bottom cars. Haulage behind the miners has not been completely satisfactory. One extensible belt is now in service and had operated eight shifts.

Continuous miners have raised output and increased coal recovery per acre by, in one instance, 6,237 tons. Two machines with bolters averaged 46.74 and 46.79 tons per manshift in 1949; 52 tons in the first quarter of 1957; and 59.35 and 54.28 tons in the opening days of April. Rates for two machines without bolters were 39.47 and 35.54 tons in 1956; 49.89 and 38.93 in the first 3 mo of 1957; and 55.16 and 39.26 tons in April. On one shift, the unit with the extensible belt marked up 91.50 tons per manshift.

MINING WITH BORERS

How six Goodman miners are used in development, room work and pillaring at Old Ben No. 9 mine of the Old Ben Coal Corp., Sesser, Ill., was detailed by George Stachura, superintendent. A report on the No. 9 program appeared in *Coal Age*, February, 1957, p 76.

One advantage of the machine employed is the large throat, which results in a size consist almost comparable to that of standard loading equipment. The top is excellent and the uniform size of the bored opening permits use of prefabricated stoppings. These are made in two sections and a crosscut can be closed in 15 min, except for the final touches around the edges.

Panels approximately 300 ft wide and 1,800 ft long are mined retreating with pairs of rooms on minimum centers, leaving pillars 40 ft thick between pairs. These are removed by 45-deg lifts driven inside thin curtains, which are cut through twice for final recovery, except for small stumps. One advantage of the system is that it is easy for men and foremen to get accustomed to.

Miners are served by two shuttle cars up to distances of about 200 ft; after 200 ft a third car may be used. The shuttle cars feed to extensible belts. The newer system is for the miner to discharge directly to a rope-type extensible belt. With this setup, as high as 1,200 tons have been loaded in one shift and 2,300 tons in two shifts.

MINER MAINTENANCE

How maintenance problems encountered in the application of three Jeffrey Colmols to the Indiana No. 5 seam, averaging 6 ft under 425 ft of overburden, were solved was the subject of a presentation by Eugene Stacey, electrical engineer, Enoco Collieries, Inc., Bruceville, Ind. This work was featured in *Coal Age*, February, 1956, p 88.

The Colmols went into service in December, 1953. Hard cutting was the problem. Steps taken to eliminate difficulties arising out of this hard cutting included:

Change in type of pilot bit and in method of attachment to prevent loss.

Mild steel arms replaced by alloy.

Bracket and tool-holder difficulties solved by welding bracket to arm and using tapered-bit holder (*Coal Age*, January, 1957, p 90).

Changes in head arrangement to cut loss of gear lubricant, reducing cost from 12c per ton to 9 mills. Redesign also made it possible to install a better spray system.

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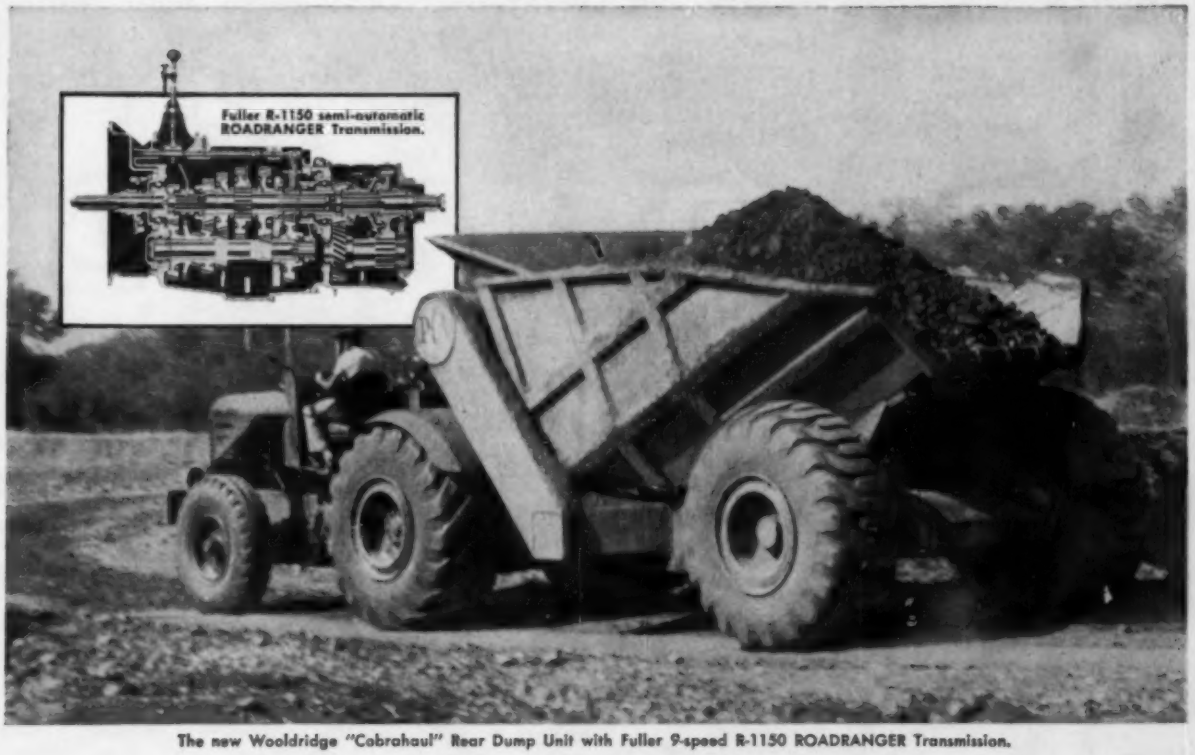

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Fuller Transmissions provide maximum ease of shifting ratios for faster acceleration and long life required for these operating conditions.

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- **Easier, quicker shifts—38% steps between ratios**
- **One shift lever controls 9 forward and 1 reverse speeds**
- **Engines work in peak hp range with greater fuel economy**
- **Less driver fatigue—⅓ less shifting**
- **Range shifts pre-selected—automatic and synchronized**

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Indiana Institute (*Continued*)

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SAFETY IN INDIANA

Indiana's retrogression in safety results and what to do about it was the subject of a panel discussion participated in by the following:

Howard T. Batman, manager, Lynch Coal Operators Reciprocal Association, Terre Haute.

William McCullough, Snow Hill Coal Corp., Terre Haute.

Charles A. Purcell, director, Indiana Bureau of Mines and Mining, Terre Haute.

F. J. Smith, Health and Safety Supervisor, District E, USBM, Vincennes, Ind.

A. G. Gossard, vice president, Snow Hill Coal Corp., Terre Haute.

"We ain't one tiny bit proud of the accident record so far this year in Indiana," declared Mr. Batman in opening the panel presentation. There have been 27 accidents in the first 3 mo, meaning bad frequency and severity both. The two exceptions to an otherwise discouraging start were Ayrshire, with no compensable accidents to April 13, and Green Valley, with nearly 200,000 manhours of exposure per compensable injury in the first quarter.

The first-quarter record of compensable injuries, mine by mine, by causes and occupations, was presented by Mr. McCullough. By causes, track haulage led the list with 6; falls of roof and rib, 5; machinery, 4; strains and sprains, 3; handling materials, slipping and falling and electricity, 2 each; and shooting, surface and other, 1 each. Injuries by occupation were: day men, 4; cutting-machine operators, drillers, repairmen, and shuttle-car operators, 3 each; loading machine operators, roof bolters, supervisors and tripriders, 2 each; motormen, shooters and top men, 1 each.

Recalling that a joint resolve to do something about mine safety resulted in a new low in fatalities (3) in 1955 and none in 1956, Mr. Purcell pointed out that in spite of the absence of fatalities the Indiana record was worse. Poor work habits, he declared, is the major reason for the slippage. The answer is more education, and it must start at the top.

The human element also was singled out by Mr. Smith in a discussion of major accidents and the responsibility therefore. In roof-fall injuries, for example, human failure is responsible for 95%. The answer is intensive training in accident prevention.

Operating people have a job to do to get back on the track on safety, said Mr. Gossard. Pertinent points include the following:

1. All of us hate accidents worse than any other part of the job. So it's worth extra effort to eliminate them from that angle also.

2. Management must take its fair share of the responsibility for work habits, which is not 50%, but 95%. Of the 27 accidents in the first quarter, 70% were the result of unsafe work habits.

On the bright side, 7 out of 8 foremen had no accidents. Contrariwise, the 27 accidents involved only 21 foremen, meaning that some had more than one. Perhaps some foremen, too, are accident-prone. In any event, better performance by foremen is essential.

Following the panel discussion Nathaniel Kirk, superintendent, Snow Hill Coal Corp., called attention to the roof-fall reduction campaign of the National Safety Council to start in July. Mines will be asked to cut such accidents by 50% in the next 12 mo, and good records will bring awards to mines, local unions and foremen. All-out cooperation was urged by Mr. Kirk.

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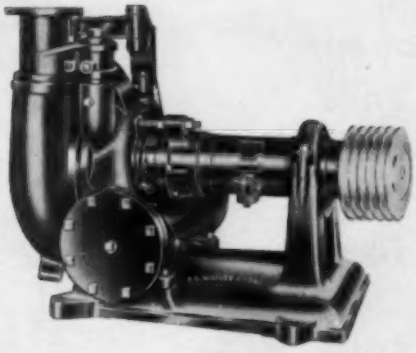

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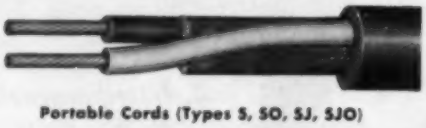

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EQUIPMENT APPROVALS

Fifteen approvals of permissible equipment were issued by the U. S. Bureau of Mines during March.

Goodman Mfg. Co.—Type 870-10 shuttle car; three motors, each 10 hp, 250 v, DC. Approval 2-1218, March 4.

Goodman Mfg. Co.—Type 870-11 shuttle car; three motors, each 10 hp, 250 v, DC. Approval 2-1219, March 5.

Ensign Electric & Mfg. Co.—Type L distribution box; one circuit breaker, 600 amp, 230 v, DC. Approval 2-1220, March 5.

Goodman Mfg. Co.—Type 403 borer; two motors, one 100 hp, one 50 hp, 230 v, DC. Approval 2-1221, March 6.

Brad Harrison Co.—Type AF-74-28-117 DC splice box. Approval 2-1222, March 14.

Joy Mfg. Co.—Types 9SC2PE/PXE-4 and 9SC2BPE/BPXE-4 shuttle cars; three motors; one 15 hp and two 10 hp, 250 v, DC for the 9SC2PE/-PXE-4 shuttle cars; three motors, each 15 hp, 250 v, DC for the 9SC2BPE/-BPXE-4 shuttle cars. Approval 2-1223, March 14.

Amherst Coal Co.—Drilling machine; one motor, 5 hp, 230 v, DC. Approval 2-1224, March 15.

Sharf Co.—Sharf dehumidifier; one motor, 75 hp, 440 v, AC, approval 2-1225A, March 15.

Greensburg-Connelsville Coal & Coke Co.—Rebuilt Joy model 32-E6 shuttle car; four motors, each 4 hp, 250 v, DC. Approval 2-1226, March 19.

J. H. Fletcher & Co.—Type DJD-7 drill; one motor, 20 hp, 230 v, DC. Approval 2-1227, March 22.

Joy Mfg. Co.—Type 8SC1BPE/-BPXE-1 shuttle car; four motors, two 10 hp and two 7½ hp, 250 v, DC. Approval 2-1228, March 22.

Femco, Inc.—Type 22-3-A three-wire grounded lighting system; 220 v, AC. Approval 29-3, March 27.

Femco, Inc.—Type 22-2-A two-wire ungrounded isolated lighting system; 220 v, AC. Approxal 29-4, March 27.

Joy Mfg. Co.—Type 15RU coal cutter; two motors, one 75 hp, one 30 hp, 220/440 v, 60 cycles or 380/500 v, 50 cycles, AC. Approvals 2-1229 and 2-1229A, March 29.

Salem Tool Co.—McCarthy underground coal auger; one motor, 50 hp, 250 v, DC. Approval 2-1230, March 29.

In addition:

American Rubber Mfg. Co.—"Merprene" fire resistant, 5-ply, cotton, 32-oz conveyor belting. Acceptance 28-18.

Here's how Bearings, Inc. helped a customer save $2,000 in 60 days!

By removing bearing inventories from several departments to one centrally located stockroom, establishing records showing every application for every bearing, the bin number where these bearings are stocked and the quantity on hand, our engineers saved our customer money and made all bearings immediately available. Many identical bearings bought by several departments for many types of machines were found in quantities exceeding normal requirements. Many bearings were unuseable — unwrapped, dirty and rusty. A few of these bearings are shown above with W. J. Lukach, Bearings, Inc. sales engineer who supervised cleaning, greasing and re-wrapping all bearings not in original boxes.

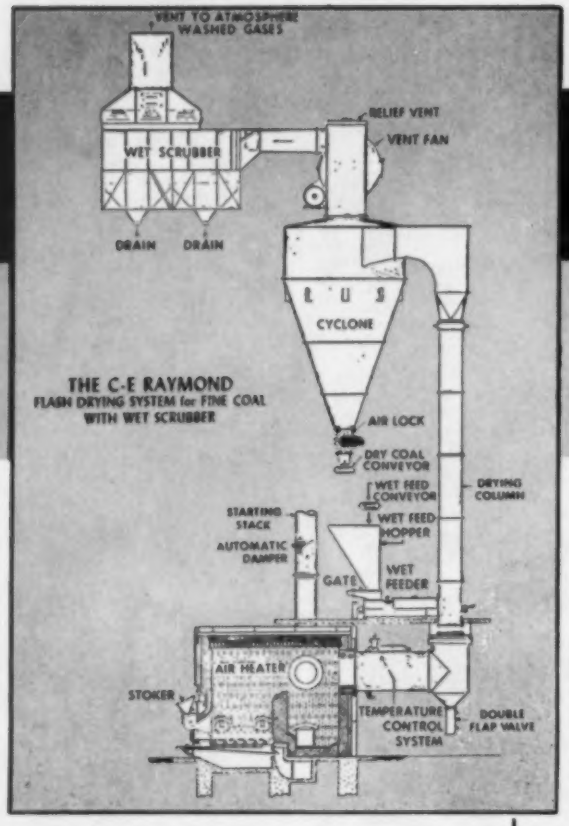
THE PAYOFF OF OUR SERVICE, ACCORDING TO OUR CUSTOMER, EMPIRE STEEL CORPORATION AT MANSFIELD, OHIO, WAS A SAVING ON BEARING PURCHASES OF $2,000 IN LESS THAN TWO MONTHS.

This is not an isolated example of our services — surveys of bearing requirements, inventory control, application engineering, maintenance schedules and procedures are a regular and continuing part of our service to all customers to whom we supply replacement bearings. Ask how we can help YOU!

Providing bearing service in the territories adjacent to our branches, listed below.

BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
DELAWARE: Wilmington •
Subsidiaries: Bolanrol Corp. • Buffalo, N.Y.• Kentucky Ball and Roller Bearing Co. • Louisville, Ky.



Flow sheet diagram of C-E Raymond Flash Drying System for fine coal, with wet scrubber.

NEW DEVELOPMENTS

C-E COAL TRAP

Degradation in the C-E Flash Drying System is of no consequence for most coal.
For soft coals, the C-E System is equipped with the C-E Coal Trap to eliminate degradation.

C-E DEDUSTING SYSTEM

This system now under development extracts the ultra-fine dust from the vent, and burns it in the furnace to produce heat for drying.

EXCLUSIVE

Advantages of C-E Raymond *Flash Drying System*

1. **Wide Capacity Range**
   From 10 to 100 tons per hour per column. Up to four columns per furnace.

•

2. **Flexible Design**
   Will fit plant layout without costly alterations. Eliminates costly coal elevator equipment.

•

3. **Lowest Building Cost**
   Vertical design requires minimum floor space. Outside construction may be used to fullest extent.

•

4. **Instantaneous (Flash) Drying is Inherently Safe**
   There is only a small quantity of coal in the system at any given time.

•

5. **Flash Drying Gives Uniform Final Moisture**
   (Especially important for Metallurgical Coals). Small quantity of coal in system results in immediate response to wet feed changes.

For further details,
write for Bulletin FD-51

COMBUSTION ENGINEERING, INC.
Raymond Division

1315 North Branch St.
Chicago 22, Illinois

Sales Offices in Principal Cities

Combustion Engineering-Superheater Ltd., Montreal, Canada

powered by White's Superior Diesel

Manitowoc 4500 cuts Ohio Stripper's cost 20%

Careful equipment selection is paying off for Terramana Brothers Coal Co., Steubenville, Ohio. For digging into 70 feet of overburden, they chose a Manitowoc 4500 shovel . . . and wisely specified the rugged, dependable White Superior Diesel for power. According to Terramana Brothers, this perfect combination greatly increased production and cut operating costs . . . resulting in more than 20% overall savings!

The big 4-yd. rig with a 60-ft. boom and a 45-ft. stick works two 10-hour shifts daily, powering away almost 400 yards per hour. The high torque Superior engine provides more line muscle . . . it pulls a full dipper with little effort. Under light load, it enables swings at top speed without surging. The faster and smoother cycle increases production!

Many cost saving advantages of Superior's design simplicity also contribute greatly to this economy. Easy accessibility of internal parts speeds servicing in close quarters. Down-time is practically eliminated because maintenance and repairs are reduced to a minimum. Many case histories show 35,000 engine hours with no major replacement parts required. Superior's first valve job usually comes due long after other engines would be completely replaced! Highly developed, open chamber combustion achieves optimum air and fuel mixture, low fuel consumption and easy starting. Precision construction throughout reduces wear and assures lowest lube oil consumption.

Specify White's Superior Diesel on your next new shovel or when you're re-powering. Power ranges from 225 to 2150 B.H.P. for all types of service. *Write for complete information today.*

White Diesel

WHITE DIESEL ENGINE DIVISION
THE WHITE MOTOR COMPANY

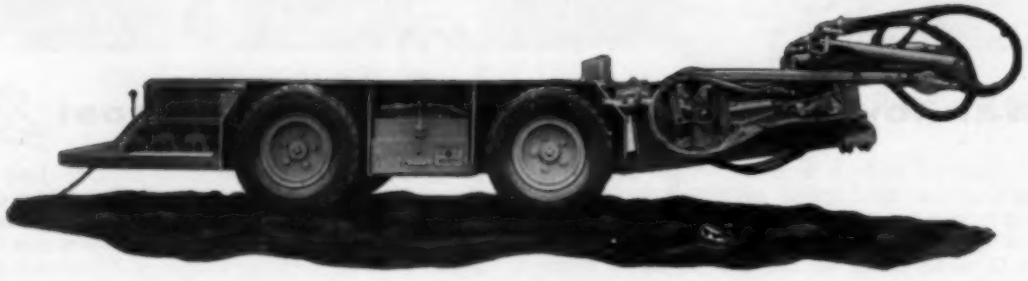
Plant and General Offices: Springfield, Ohio

The NEW
ACME Jumbolter
with
FOUR WHEEL DRIVE

(Each wheel a driving unit with Individual Suspension)

will be shown at
Booth 725

American Mining Congress Exposition
Cleveland, Ohio
May 13-14-15-16

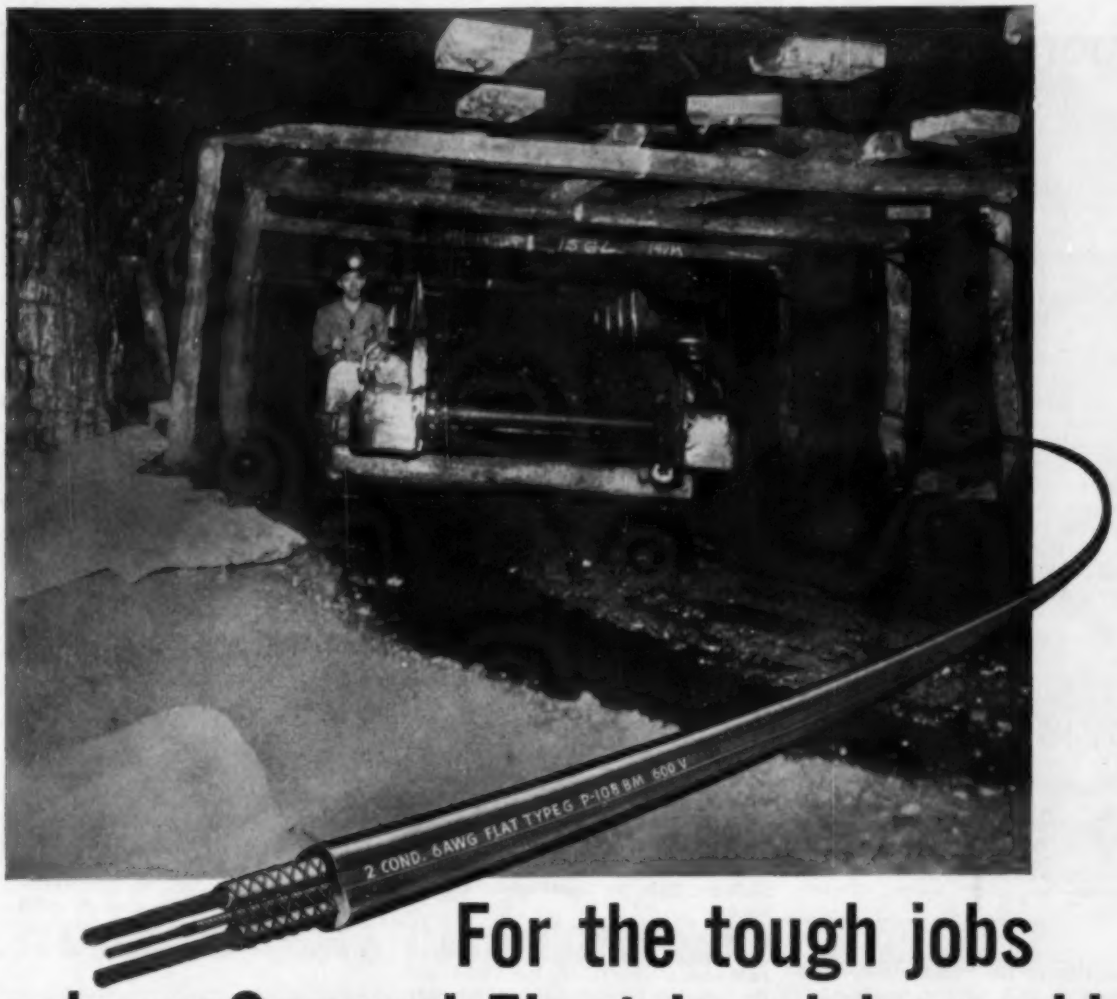


The New Acme JUMBOLTER Model HSJ 4WD

Front platform now elevates to clear rough bottom. Turns in its own length. Many other new features.

ACME Machinery Company

WILLIAMSON, WEST VIRGINIA



For the tough jobs rely on General Electric mining cables

Jagged rocks, moisture, even chemicals, constantly attack mining cable. In addition, cable may be crushed under heavy equipment, bent, or twisted. For severe conditions like these, it pays to rely on sturdy and resilient General Electric mining cable. These types have proved their outstanding performance on tough jobs:

Mining Machine Cable, Types W and G—Designed for especially severe conditions, such as being dragged behind mining machines, hit by picks, run over by equipment. Is exceptionally flexible, resilient, and abrasion-resistant.

CordX*—A heavy-duty, flexible cord for use on portable electrical equipment where severe usage is encountered and where exceptional mechanical, moisture, heat, and chemical resistance is required. Has U. S. Bureau of Mines approval.

Borehole Cable—A steel-armored cable with extra tensile strength for vertical suspension, either varnished-cambric- or rubber-insulated.

Mine Power Cable—A nonmetallic-sheathed cable for primary distribution to load centers. For use in haulageways, in airshafts, suspended from roof supports, or in boreholes.

FOR FULL INFORMATION on how G-E wire and cable can improve your distribution system, call your General Electric representative or write Section W216-514, Wire and Cable Department, General Electric Company, Bridgeport 2, Connecticut.

*Registered Trade-mark General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

Among the Manufacturers

This was the news:

Joy Mfg. Co. was completing a $3 million warehouse expansion program aimed at bringing renewal parts and service closer to mines.

The company's plan to bring warehouses, trained personnel, and truck service nearer moved a step toward completion with the opening of a warehouse in Norton, Va., to serve eastern Kentucky, eastern Tennessee, and southwestern Virgina. Staffed with parts, sales, and service personnel, the facility will operate a fleet of trucks to make twice-weekly calls at district mines and to provide emergency deliveries. But the Norton warehouse is only one unit of the Joy network. In Meadowlands, near Washington Pa., the largest installation is already in service with $2.5 million in renewal parts destined for delivery among mines in northern West Virginia, western Pennsylvania, and eastern Ohio.

In Huntington, W. Va., Joy recently doubled warehouse capacity. Similar plans are underway for enlarging a warehouse at Centralia, Ill. Another, at Fairmount, W. Va., is soon to be converted entirely to unit rebuilding service. New installations, too, are part of the overall warehouse expansion. Two sites, Pinesville, W. Va., and Madisonville, Ky., have already been chosen for construction of 30,000-sq ft and 20,000-sq ft installations. Joy's own explanation of its expansion—"to offer more effective servicing."

Dorr-Oliver, Inc., broke ground to construct a $2.5 million headquarters building in Stamford, Conn.

Top level administrative and executive staffs, including finance, sales, and advertising, will occupy the building which is scheduled for completion in May, 1958. Dorr-Oliver is building its headquarters on an 18-acre site. Specifications call for 125,000 sq ft of office space.

Link-Belt Speeder Corp. continued its "decade of expansion" by disclosing plans to construct additional production facilities at headquarters in Cedar Rapids, Ia.

The new facilities will enable Link-Belt Speeder to increase production of power cranes and shovels by as much as 40%. Link-Belt Speeder, a subsidiary of the Link-Belt Co., began expanding in a major way in 1948 by replacing its original buildings with new ones that doubled production. Two more expansions followed, one in 1953, and another in 1956.

Euclid Div., General Motors Corp., began building a 650,000-sq ft plant in Hudson, Ohio, to manufacture crawler tractors.

The plant is expected by Euclid to be operating in July, 1958. Three models of earthmovers—the TC-12, the TS-24, and the C-6—will be turned out. The facility represents the first phase of expansion plans that specify construction of additional manufacturing facilities, a parts warehouse, and general offices in Hudson.

Firth Sterling, Inc., Pittsburgh, Pa., formed a Canadian corporation named Firth Sterling (Canada) Ltd.

The venture was financed jointly by Firth Sterling and Canadian investors, who will construct the plant at Brantford, Ont., to produce tungsten carbide tips for sale to the manufacturers of rock bits. Initial production is expected to begin in the third quarter of 1957.

Rome Cable Corp. acquired T. J. Cope, Inc., Collegeville, Pa., a special products maker for the electrical industry.

Under terms of the agreement Rome Cable will acquire the plant, equipment and assets of T. J. Cope. No purchase price was disclosed in Rome Cable's announcement. The Cope plant is situated a few miles from Philadelphia and will be integrated into the Rome Cable Corp., which in 1950 purchased an electrical conduit manufacturing firm in Torrance, Cal. Because of the new acquisition, Rome Cable announced, "customers will be able to procure an even larger measure of their requirements since we will be offering wire and cable, conduit, cable trays and racks, and a variety of other equipment for the installation of cable."

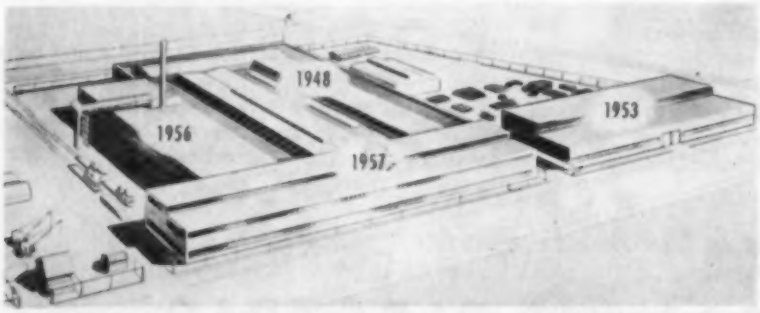
CRAWLER TRACTOR PLANT being built by Euclid Div., General Motors Corp., will rise in Hudson, Ohio, where three earthmover models will be manufactured by the company.

National Mine Service Co. acquired the Clarkson Mfg. Co., a Nashville, Ill., maker of continuous miner and loader chains.

National Mine disclosed no purchase price, but said it will operate the new company as the Clarkson Div., National Mine. Under the brand name "Red Bird" Clarkson has made not only chain, but a coal loading machine and the "Marietta" continuous miner. With the acquisition National Mine becomes a major producer of mining equipment. Only 5 mos ago National Mine announced the manufacture of a new line of shuttle cars. It has been making mine locomotives, too, for several years.

Link-Belt Co. is building a $5 million bearing plant in Indianapolis to replace its present Dodge bearing plant.

No price was disclosed by Link-Belt which said only that the new plant will increase capacity 50%. Construction will begin this year and is expected to end in 1958. Full production is scheduled for 1959. Link-Belt is erecting the plant a few miles west of Indianapolis on a 70-acre site. Initial employment of 600 persons is expected to swell to about 1,000. Total area will be approximately 400,000 sq ft.



DECADE OF EXPANSION by Link-Belt Speeder Corp. began in 1948. Newest plan unfolded will increase production 40% at Cedar Rapids headquarters plant. Construction is scheduled for area in photo labeled "1957."

...Delivers "More Use per Dollar"

You can't use a longer lasting, safer belt for hauling full loads in underground mining operations! Special cushioned strength members and resilient synthetic outer plies provide *double* compensation to give Ray-Man Conveyor Belt unusual flexibility. It trains naturally, troughs easily . . . handles *more* coal even where thick, narrow belts are used . . . or where small pulleys are required in low head-room installations. R/M's exclusive "XDC" Cover provides a degree of protection against wear, tear, cuts and abrasions never before possible! Ray-Man requires *no* breaker strip . . . yet it resists gouging and ripping, holds fasteners better than any other belt construction.

Like all Manhattan underground belts, Ray-Man is mildew-proof and moisture resistant, and available in R/M's special fire-resistant construction awarded Bureau of Mines' acceptance designation: "Fire-Resistant, U.S.B.M. No. 28-10." Ray-Man Conveyor Belt does a *better* job, *longer* . . . and it's *safer* to use!

Other Manhattan conveyor belts also offer special engineered features for long, trouble-free service. Ask an R/M representative about Homocord, extra-cushioned for unusually abusive shock loading . . . R/M Tension-Master, for extra long lifts and high tensions. For every job requirement, there's a Manhattan heavy duty conveyor belt to give you "More Use per Dollar." Write for descriptive bulletins.

More Dependable Mine Drives with R/M *Poly-V*®

This patented new concept in heavy duty drive transmission delivers up to 50% *more* power in the *same* space as ordinary V-belts . . . *equal* power in *less* space! It employs a *single*, V-ribbed belt . . . eliminates "matching" problems . . . cuts belt and sheave inventories to a new low! Write for a copy of Poly-V* Drive Bulletin #6638 *today!*

**Poly-V is a registered Raybestos-Manhattan trademark.*

RM-711

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

The 6" Pump that handled 10" PIECES OF SLATE!

When the operators of a West Virginia mine installed this 6" Wemco Solids Pump, they put it to work handling 2¾ x 0 Chance Cone Reject, pumping 500 GPM at 25' TDH. It not only proved to be the most efficient coal-handling device they had ever seen, but it also consistently passed pieces of slate as large as 4" x 10" and occasional tramp iron and other debris — *without stopping!*

The Wemco torque-flow Solids Pump works on the unique principle of a "can't-clog" *liquid impeller*. Write for complete details on this amazing new pump, now in use by dozens of mines, cleaning plants, preparation plants, and other coal operations.

WEMCO

TORQUE-FLOW SOLIDS PUMP

WESTERN MACHINERY COMPANY

650 FIFTH STREET, SAN FRANCISCO 7, CALIF.

Manufacturers (*Continued*)

American Cyanamid Co. began expanding and rebuilding facilities to manufacture industrial high explosives.

The result will be an annual explosives production increase of approximately 60% by September. American Cyanamid, which operates plants in Latrobe and New Castle, Pa., will do most of its expanding and rebuilding at New Castle where an explosion of ammonium nitrate damaged the plant last year. Ten buildings will be added at New Castle, comprising replaced facilities and new construction.

Rome Cable Corp. began construction of a $500,000 research center in Rome, N. Y.

The new center, a 121-sq ft building with a floor area of 25,600 sq ft, will be completed by November. It will contain a complete pilot plant for experimental production runs. An outdoor area for weather-testing cables is being included. Fundamental research will be the center's main task.

RESEARCH CENTER costing $500,000 will be built in Rome, N. Y., by the Rome Cable Corp. for fundamental research.

Burndy Corp., Norwalk, Conn., doubled its two-man field engineering group, appointing Richard Harap chief field engineer and head of the group.

The expansion will make the company's technical service for problems of electrical connectors, connection methods, and installations tools more accessible to representatives and to customers. In addition to Mr. Harap's appointment, Burndy also appointed James T. Gale senior field engineer. Both men have been Burndy field engineers for 6 yr. Henry Shavel and Jerome S. Penzner were named field engineers and complete the group.

Dorr-Oliver, Inc., opened an office in Pittsburgh, Pa.

The office will serve process industries in western Pennsylvania and the Ohio River valley of West Virginia, areas previously served from headquarters in Stamford, Conn. Pump service and marketing, however, will still be handled by Quentin Cunningham, Dorr-Oliver's Pittsburgh representative.

Mr. F. Roberts, manager of apparatus sales, Mining Div., Jeffrey Mfg. Co., was elected a vice chairman of the Mining Belt Conveyor Section of the National Electrical Manufacturers Association.

Mr. Roberts succeeds A. R. Anderson, who retired from Jeffrey recently after serving as general sales manager. In other NEMA elections William Hanson, Jr., manager of conveyor products, Joy Mfg. Co., was elected chairman of the Section's technical committee.

I. F. Wilson was appointed district sales manager of National Mine Service Co.'s Whiteman Div., Indiana, Pa.

Mr. Wilson moves from a job as district sales representative in the division. Murray D. Smith, a member of the division's internal sales staff, was named assistant to Mr. Wilson. In other National Mine changes, R. Park Lamborn, a district sales representative, was assigned the sales territory vacated by Mr. Wilson in Uniontown, Pa. And, C. E. Lockard was transferred from the Western Kentucky Div., Madisonville, Ky., to Mr. Lamborn's former territory in Indiana, Pa.

Joseph E. Ward was named assistant manager, Pittsburgh Coal Sales, Joy Mfg. Co.

From headquarters in Pittsburgh, Mr. Ward will direct and assist the field representatives of the Pittsburgh district in sales and service of mining machinery, in addition to other basic Joy products. Before his association with Joy, Mr. Ward had been for 15 yr an underground supervisory official for the Tennessee Coal-Iron & RR Co., and for the Hudson Coal Co. He also had been a sales representative for Mine Safety Appliances Co.

Kenco Pump Div., Lorain, Ohio, moved James G. Huiett from service manager to sales manager.

Mr. Huiett's duties include charge of

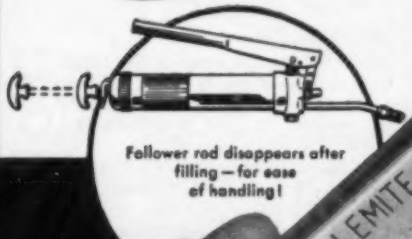
10,000 LBS. OF POWER

for even ordinary lubrication jobs!

FAST, EFFICIENT HEAVY-DUTY ALEMITE HAND GUNS

Linkage is heavy steel for true piston alignment!

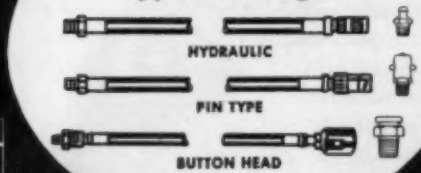
This rugged Alemite lever-type gun is packed with power and superior features for super performance in industrial lubrication! Develops 10,000 lbs. pressure . . . more than enough for ordinary lubrication jobs—with plenty of reserve power for "tight" bearings! Handles all regular pressure gun greases. Long-operating handle for maximum leverage. Loader fitting permits fast, clean filling (or gun may be filled by suction). Capacity, 1 lb., outlet, ⅛" p.t.



Follower rod disappears after filling—for ease of handling!

Heavy-duty Lever Gun
Model 1056-SE

Loader fitting for fast clean filling with loader pump. No mess—no waste—no air pockets!



Complete line of adapters and hose for all types of fittings!

STEWART SW WARNER

ALEMITE

REG. U. S. PAT. OFF.

Division of STEWART-WARNER CORPORATION

Mail Coupon for FREE Catalog!

Alemite, Dept. N-57, 1850 Diversey Parkway
Chicago 14, Illinois

Please send me your complete catalog on Alemite lubrication equipment for industry.

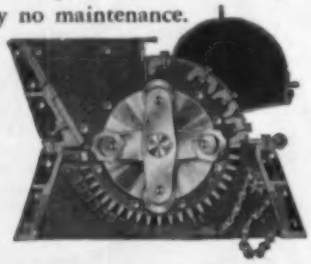
Name .....

Company .....

Address .....

City ..... Zone ..... State .....

Uniform product control means better combustion and greater efficiency. Power for power, Gruendler crushers produce more with practically no maintenance.



Cross-section view of the Gruendler Ring Hammer Crusher with patented tramp iron catcher.

Whatever the job of crushing coal, Gruendler has the right crusher. The Gruendler Company has pioneered in the field of reduction machinery since 1885 and produces a complete line for power plants and mines, including single and double roll, rotary breakers, ring hammermills, portable crushers.

WRITE FOR BULLETIN 154,
"HOW TO SELECT YOUR COAL CRUSHER"

GRUENDLER
Crusher & Pulverizer Co.
2915 No. Market • St. Louis 6, Mo.

Manufacturers *(Continued)*

sales and service for the entire Kenco line of submersibles. He has been associated with Kenco pumps sales and service since 1950.

Gar Wood Industries, Inc., Wayne, Mich., appointed Ross Miller sales manager of Gar Wood—St. Paul dump truck bodies and hoists.

Mr. Miller's duties included coordinating and supervising sales activities for the entire line of dump truck bodies and hydraulic hoists. A member of the company since 1920, Mr. Miller has held the positions of national service manager, regional manager, Pacific coast general manager, and sales manager for Gar Wood Industries, Mattoon, Ill.

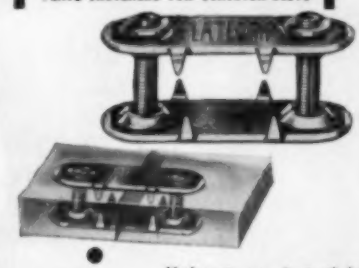
The appointment of W. Oliver Spencer, Jr., as industrial sales representative was announced by the Iron Fireman Mfg. Co., Cleveland, Ohio.

Mr. Spencer will specialize in the sale of Iron Fireman stokers in North Carolina, South Carolina, Virginia, and West Virginia. Before the new appointment Mr. Spencer had been associated with Combustioneer for some 10 yr.

International Harvester announced a series of personnel changes among the company's top management.

The changes: Ralph M. Buzard, manager of sales, Motor Truck Div., was made general manager of the division; Louis W. Pierson, assistant manager of sales, Motor Truck Div., was promoted to manager of sales succeeding Mr. Buzard. William E. Callahan, sales manager of the Motor Truck Div.'s eastern region, was named assistant sales manager. Mr. Buzard gained his early sales experience with International Harvester at Cleveland and Columbus, after which he was transferred to the company's general office in Chicago as head of company retail operations. After serving as manager of the central, northwest, and western motor truck regions, he was named assistant manager of motor truck sales in 1946. He was promoted to manager of sales early in 1954. Mr. Pierson began with International at Billings, Mont., moved to Fargo, ND., and headed the Minneapolis and Milwaukee districts before moving to Chicago. Mr. Callahan was assistant district manager in Chicago and New York, assistant manager of the eastern and east-central motor truck regions, and manager of the central motor truck region before his appointment as manager of the eastern motor truck region in 1954.

PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from 1/4" to 1 1/2" thickness. Write for Catalog Sheet.

ARMSTRONG BRAY & CO.
5140 Northwest Highway, CHICAGO 30, U. S. A.

Arnold W. Asman, head of the Dept. of Mining, Pennsylvania State University, was appointed product manager of mining equipment sales, Hewitt-Robins, Inc.

The appointment is effective July 1. Mr. Asman succeeds R. U. Jackson, who is scheduled to retire in 1959. Mr. Asman has been associated in engineering with the Eastern Gas & Fuel Associates, the Hatfield Campbell Creek Coal Co., and the Armco Steel Corp.

Bucyrus-Erie Co. announced the appointment of Henry M. Jameson as general manager of the Drill Div.

Mr. Jameson's headquarters will be in Richmond, Ind., where Bucyrus-Erie is building a new plant. He joined the company in 1937 as tractor equipment manager after associations with the Insley Mfg. Co., and the Allis-Chalmers Mfg. Co.

Gordon N. Dow was assigned to the post of general sales manager of the Leschen Wire Rope Div., H. K. Porter Co., Inc.

Mr. Dow had been a salesman in the Detroit area and sales manager of the Chicago district for Leschen before the appointment. His headquarters will be in Leschen's main office in St. Louis.

Kenneth D. Lloyd was appointed "Intermountain" field service engineer for the Model 105 Tractor Div., Eimco Corp., Salt Lake City, Utah.

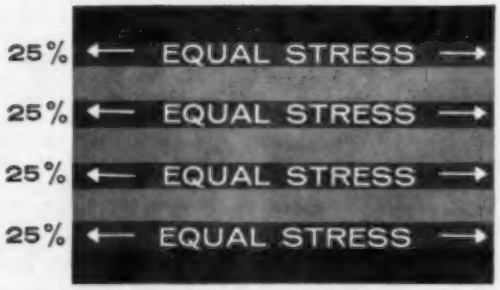
An experienced maintenance man, Mr. Lloyd will serve as a factory service representative in Utah, Wyoming, Colorado, and other states. He will instruct owners in proper maintenance and operational procedures of the Model 105

STOP PAYING FOR "LAZY" PLIES THAT SHORTEN BELT LIFE!

BOSTON'S

Balanced Belt Construction* equalizes stress!

CONVENTIONAL BELT CONSTRUCTION



BBC-BALANCED BELT CONSTRUCTION

BBC — Balanced Belt Construction equalizes ply stress — every ply pulls its full share of the load! BOSTON'S exclusive manufacturing methods eliminate "lazy" plies which put extra strain on other plies and cause premature rupture and belt failure.

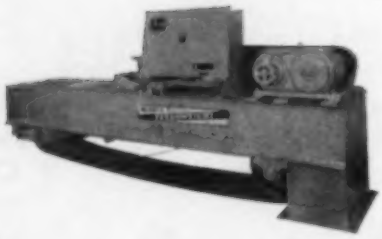
BBC is the result of two advanced BOSTON processes: *Electro-Tensile Control*, which electronically controls ply tension; and *Rotocure* the only continuous method of vulcanization, which assures uniformity throughout the belt.

With Balanced Belt Construction, BOSTON belts set entirely new standards of longer, trouble-free service and greater economy.

***BOSTON FLAMEOUT BELTS OFFER MAXIMUM UNDERGROUND FIRE RESISTANCE!**

(United States Bureau of Mines Designation No. 28-9)

BOSTON BOSTON WOVEN HOSE & RUBBER CO.
BOSTON 3, MASSACHUSETTS



Yes-feed by weight

with the MERRICK FEEDOWEIGHT, a self-contained automatic conveyor scale, with automatic gate for feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Uniformly feeds bulk material BY WEIGHT; automatically totalizes weight of materials fed. Simple to operate. Slow moving parts mean long life. Easy to install, maintain.

Manufacturers of

The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveyor operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.
Engineers and Mfrs. of Automatic Weighing Equipment
PASSAIC, N. J.

Manufacturers (*Continued*)

tractor-excavators, bulldozers, and front-end loader.

J. S. Morgan was named director of domestic sales for the Allis-Chalmers Industries Group.

Mr. Morgan, who had been director of utility sales for the Industries Group, will be responsible for the administration and activities of the field sales organization.

Warren H. Thompson was assigned to the general supervisor's post of International Harvester's Sales Development, a section of the Construction Equipment Div.

Mr. Thompson had held the post of assistant general supervisor before his new assignment. Prior to that he had been a sales consultant.

George E. Gunther, assistant sales manager of Thew Shovel Co., was made sales manager of shovel and crane products.

In the new job Mr. Gunther will assume full responsibility for the supervision of Thew's district sales managers and the direction of sales activities with domestic distributors. Mr. Gunther joined Thew in 1948 as a district sales manager. He was appointed assistant sales manager in 1951. In other appointments at Thew, Wilson H. Madden became sales manager of special products, moving up from merchandising methods manager; Quincy J. Winsor, manager of sales development became sales technical manager; and Ralph T. Cobb, retaining the title of sales office manager, was given expanded duties in company organization.

Elmer A. Trask became Cleveland district manager of the Wire Rope & Aircord Div., John A. Roebling's Sons Corp.

Mr. Trask succeeds Earl A. Frazer, who was moved to Roebling's New York district office as head of wire rope and aircord sales. Mr. Trask is a former products sales manager for the company's main office and plant in Trenton, N. J. He began working for Roebling 33 yr ago as a warehouseman and splicer. His new sales territory includes Ohio, sections of Michigan, West Virginia, Pennsylvania, and western New York.

Robert L. Larson was assigned as general manager of the new Indianapolis plant being built by Joseph T. Ryerson & Son, Inc., a steel distributor.

Mr. Larson began working for Ryerson at its Milwaukee plant in 1945. He became a sales representative for the company's alloy steel department in Chicago in the following year. In 1950 he was promoted to manager of the department. In 1954 he was appointed manager of the Alloy Steel Div. In other Ryerson promotion announcements for Indianapolis, Fraser Martin was named superintendent; Thomas P. Powers, inside sales manager; Richard C. Miller, credit office manager; and Lawrence N. Welberg, manager of merchandise inventory.

C. M. Donahue and E. W. Merry were elected group vice presidents of Mine Safety Appliances Co.

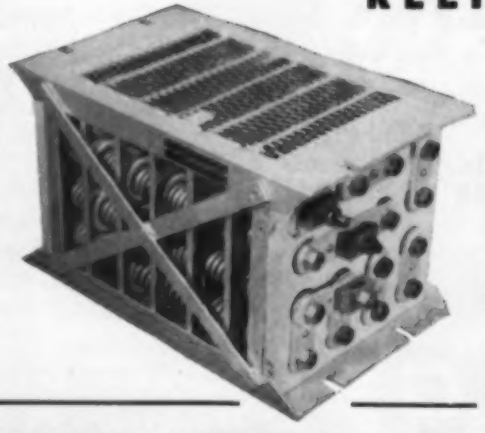
Mr. Donahue will head the Mining Products & International Group, Mr. Merry, will head the Industrial Products Group of the company. Each will be responsible for engineering, manufacturing, and sales of products. Mr. Donahue joined MSA in 1927. In 1946 he was named manager of the Mining Dept., and in 1950 manager of the International Div. He was elected a vice president in 1953. Mr. Merry joined MSA in 1936 as manager of market research. After serving in various posts throughout the company he was named director of sales planning in 1946.

Robert Zaborowski was appointed vice president in charge of the Roberts & Schaefer Co. sales division.

At the same time Eugene V. Kipp was named vice president and chief finance officer. Both men assume duties formerly carried out by R. E. Sloan, who recently resigned because of poor health. Mr. Zaborowski has been with Roberts & Schaefer for 20 yr.

LOCOMOTIVE RESISTORS

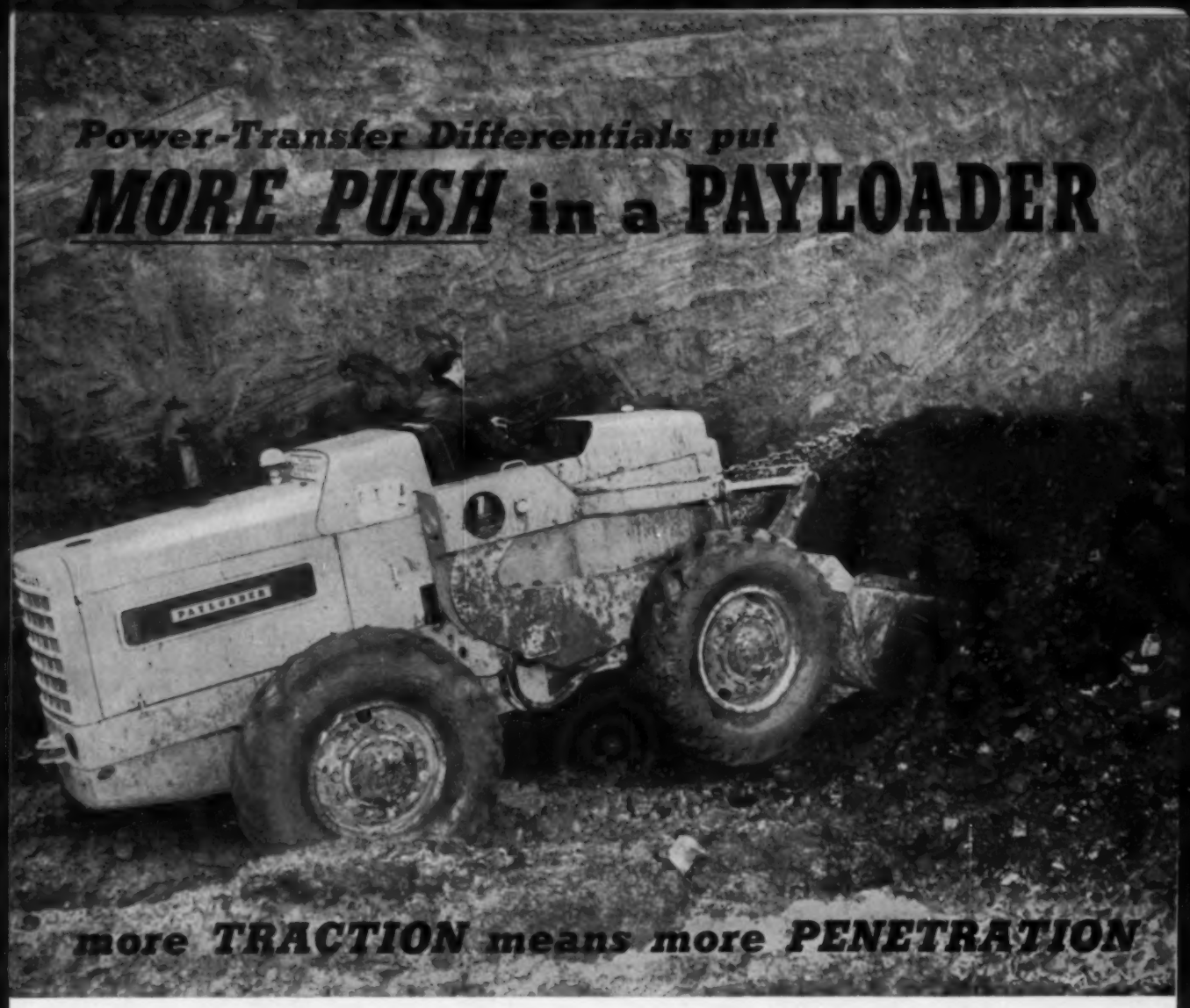
RUGGED-RELIABLE



● Have ample resistance to start locomotives smoothly on the first point and sufficient capacity for long life. No special frame construction is necessary. Just mount the units in place and connect controller leads.

Write for GUYAN Bulletins. We supply a complete line of resistance products.

GUYAN MACHINERY CO. LOGAN W. VA.



There's more punch — more push — more penetration with a "PAYLOADER" because automatic power-transfer differentials assure better traction in adverse conditions — on loose underfooting, sand, mud, snow and ice. If one wheel slips, more power is automatically transferred to the opposite wheel, enabling a "PAYLOADER" to keep driving forward, where ordinary tractor-shovels spin helplessly. You get traction and *action* instead of wheel-spinning, time-and-power-wasting *inaction.*

These special, more-costly but more-effective differentials are but one of the many reasons why you get more tractor-shovel when you buy a "PAYLOADER" . . . why they dig more, carry more and deliver more yards per day than any comparable size tractor-shovel. You also get no-stop power-shift transmissions, planetary final drives, power-steer, 4-wheel power brakes, hydraulic load-shock-absorber . . . and you get the exclusive "PAYLOADER" bucket motion with 40° tip-back at ground level plus powerful pry-out action.

Your "PAYLOADER" Distributor would like to show you what a "PAYLOADER" can do — loading trucks and gondolas, stripping, cleaning off veins, stockpiling, spotting cars — how they get around fast from one job to another. Call him today.

Power-Transfer Differentials...

automatically direct the most power to the wheels that are gripping — whenever the other wheels tend to spin on mud, loose sand, ice, snow, etc.

PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
2nd Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" units.

☐ Model HO — 2¼ yd. payload, 1¾ yd. struck
☐ Model HH — 1¾ yd. payload, 1½ yd. struck
☐ Model HU — 1½ yd. payload, 1 yd. struck

Name _____

Title _____

Company _____

Street _____

City _____ State _____

69

How deep is the overburden?

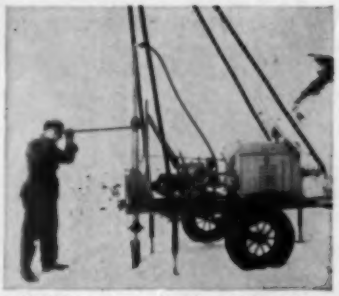
Why guess when these low-cost, easy to operate Acker LD Core Drills tell you

Quickly!

Easily!

Inexpensively!

1. Quality of Coal
2. Thickness of Seam
3. Depth of Overburden



Model LD powered with a 12HP motor for depths to 300'.

Model LD powered with a 7HP motor for depths up to 150'.

For simplicity of design and operation you just can't beat the Acker LD. We've kept moving parts to a minimum and eliminated all feed gears or screws. (Elimination of unnecessary parts cuts down weight, too—an advantage when operating in isolated locations.)

Our newly designed double tube core barrel retrieves samples even where others fail!

Your choice of power and mounting.

Write today for prices and Bulletin 21 CA

ACKER DRILL CO., INC.
SCRANTON 3, PA.

SUTPHEN'S WOOD PIPE FOR MINE SERVICE

Sutphen machine-made wood pipe is recommended for all types of mine service. It is particularly endorsed for drainage lines.

WOODS USED: California red wood, clear, all heart stock—rot resistant and termite resistant. White pine. Hard pine. Special hard wood—for flushing culm and other abrasive materials. Wood pipe is not affected by electrolysis.

SIZES Made in sizes from 3 in. up to and including 24 in. for pressures up to 172 lb. per sq. in. Pipe lengths up to 12 ft. Shorter lengths can be furnished to lay around curves without fittings. (Sutphen wood pipe carries 14% more water than metal pipe due to less friction.)

JOINT FITTINGS: Fittings can be supplied for connections to either wood or metal pipe.

COST OF LAYING: Much less than for cast-iron pipe. No special labor or material needed in making joints. It's lightness permits easy laying.

PETER O. SUTPHEN WOOD PIPE showing Tenon and Socket Joints which drive tight and swell tighter after saturation.

PETER O. SUTPHEN (Est. 1945)
SUCCESSOR TO A. WYCOFF & SON COMPANY (EST. 1855)
UNDERGROUND AND EXPOSED WOOD WATER PIPE
Box 58 Everett, Pa. Phone 39

BCR Meeting (from p 202)

have to compete economically and technologically with oil and natural gas, to cite only its severest present-day competitors. Energy from the atom and the sun will enter the picture in the future, and these sources of energy may eventually take over the biggest markets for coal. Although that day appears to be far away, this fundamental change in the energy pattern should not be overlooked.

"With the proper approach to research, coal need not just accept the residual demand that cannot be supplied by other energy sources, nor need it fear that it will lose its value as a commodity . . .

"The bureau's work on coal is largely concentrated in the area of applied research, with some overlapping into basic research and some into development . . . A great deal of our present research is aimed at securing new markets for coal, as well as making coal available to future markets with increasing efficiency. For this reason, we are continuing to investigate methods that promise a higher recovery of coal, that are adaptable to peculiar coal formations (such as our extremely thin or extremely thick seams), and that can be applied to faulted roof areas and steeply pitching seams.

"We are gasifying coal right in the ground . . . working on the conversion of coal to fluid fuels: that is, gaseous and liquid fuels . . . developing gasification of coal with steam and oxygen at elevated pressures—pressures that are the same as those at which the product gas will be used . . . collaborating with the AEC on a new scheme of gasifying coal, using atomic energy to supply the heat necessary for the process . . . expending considerable time and effort on the problems connected in the conversion of coal to liquid fuels . . . in coal hydrogenation are now turning our attention to methods of contacting coal with hydrogen that differ radically from the conventional process . . . in Fischer-Tropsch process development are just beginning to test a method carrying out the synthesis that had been abandoned in Germany some 10 to 15 yr ago . . . and are actively pursuing the identification, separation and upgrading of the liquid products obtained from low-temperature carbonization."

WINDOW ON TOMORROW

Joseph W. Barker, Chairman of the Board, Research Corp.

"Buried somewhere in the unexplored, uncharted depths beyond the present frontiers of science there is a vast domain of unknown knowledge of nature's laws. Each faltering exploration into these frontiers opens up new areas of knowledge which inquisitive, trained, skillful, creative minds can employ to enrich our technology and improve our standard of living . . .

"This cooperative industry-sponsored research organization . . . is an example of one approach to this intriguing field of endeavor. The foundation which I have had the pleasure of leading represents another and different approach. The individual company research organization is a third. Government supported

Attaching shielding ground wires to grounded messenger, workman completes joint in Anaconda 250 Mcm, 15,000 volt, grounded neutral, butyl-insulated, shielded, neoprene-jacketed cable in underground western mine.

What's this--Anaconda Aerial Cable underground?

Although the use of aerial cable underground sounds slightly incongruous, more and more mines are finding that it makes good sense. Good dollars and cents, too.

Cable is out of the way of damage by equipment, is easier to move, better for re-use. And there's no ditch to dig or fill. Simple installation, easy jointing and tapping reduce time and labor.

But there's more. Butyl insulation gives Anaconda mine power cable (aerial or otherwise) long-aging characteristics, improved resistance to moisture, ozone and heat. Neoprene jacket is rugged, tough – has real flexibility, resists rock cutting, impact, flame, sun and corrosive mine water.

Your Anaconda distributor has the facts and can help you choose the cable best suited to your needs. Call today! Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

see the Man from ANACONDA®

for MINE POWER CABLE

TROLLEY
MATERIAL
HEADQUARTERS

Booth
2505
CLEVELAND

The
ELRECO
CORPORATION

CINCINNATI 25, OHIO

BCR Meeting *(Continued)*

or conducted research is another. And university research is still another. Each of these has an important role to play in the entire spectrum of research. Each interacts on the other. Each has a definite reason for existence."

BCR PROJECTS

A. A. Potter, President, Bituminous Coal Research, Inc.

"The marked increase in the demand for bituminous coal during the past year has been reflected in greater activity on the part of the research organization of the industry—Bituminous Coal Research, Inc. Since the establishment of the coal industry's research laboratory in 1953 for the general program, BCR has demonstrated that improved and economically competitive equipment for the utilization of coal can be developed through research.

"Four different types and sizes of coal-burning automatic package boilers, some developed by BCR, or in cooperation with others, may be seen at the Columbus laboratory . . .

"BCR is continuing to assist in the development of equipment for the residential market, such as, the Campbell stoker and Stokermatic heater. It now has in the field, in addition, a considerable number of Coal-O-Matic residential ash-removal units for complete automatic residential heating . . .

"BCR has been fortunate, through the creative endeavors of one of its research engineers, to develop in the Columbus laboratory a new design which makes possible the flow of coal, of a wide range of sizes and moisture content, through bins, bunkers, and silos . . .

"BCR research on the stack spray has resulted in a low-cost means of abating soot and dust emission in small plants . . .

"BCR is giving special attention to the problems of the large users of coal . . .

"BCR is constantly making market and technical surveys to insure that the creations of it laboratories will have market possibilities . . .

"The direct-fired gas-turbine locomotive . . . is ready for commercialization . . .

"The Mining Development Program includes the extensible belt, improved roof supports, cutter bits, main-line transportation, mine illumination and other studies . . .

"BCR has during the past year cooperated with the government in the preparation of I.C. 7754, 'Outlook and Research Possibilities for Bituminous Coal.' It prepared and submitted to the BCR board of directors on June 8, 1956, a report on 'An Expanding Industry-Supported Coal Research Program' in which it indicated the projects BCR is ready to undertake, as its income permits, in the fields of coal preparation, industrial steam and space heating, electric utilities; metallurgical, carbonization, gasification and chemical coal uses; and coal chemical and physical properties. BCR has in its plans for the future greater activity in all areas and markets, including on- and off-track, and new potential users such the chemical industry."

THE NEW BCR

Harold J. Rose, Vice President and Director of Research, Bituminous Coal Research, Inc.

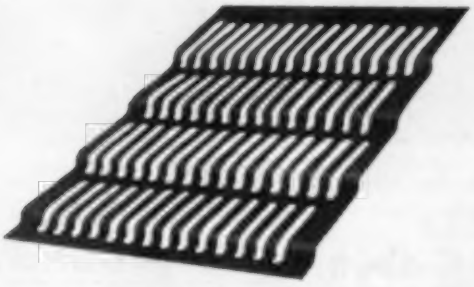
"During the past several years, BCR's general research program has undergone a major change in its method of operation. This has greatly increased BCR's ability to get the results which you want, and at lower cost. Until recently, BCR's main program had no research laboratories of its own, but was instead a research-sponsoring organization. That is, it had to 'farm out' its research projects for handling by various outside research organizations and universities.

"Now, BCR is a research-conducting organization, with two well-equipped laboratories of its own. It has a capable and enthusiastic staff, whose members are devoting their full efforts to serving the needs of member companies and coal users.

"Month by month, we can see the effectiveness of BCR's staff and facilities accelerating. Much more has happened than just a change in procedure. Experience has already proved that BCR through its own laboratories and its own research and development staff can get results that are more practical, in much less time and at less cost than formerly . . .

"There is no doubt on the part of your officers that the effectiveness of BCR during the past 2 or 3 yr has been greater than at any time in the past. You may be wondering how expensive the new ar-

MORE COAL
YOUR GOAL?



Specify
Hendrick
Flanged
Lip Screens

Vibrating screens that blind too often can knock a big hole in production schedules. But here's an easy out . . . try a Hendrick Flanged Lip Screen!

Hendrick screens provide better separation and practically eliminate costly delays caused by blinding. Ideal for shaking and gravity screens and discharge chutes. Flanged Lip Screens are furnished with openings from .010 x .025 x ½ (equivalent to 1/32" Round) to 10-½ x 11-½ x 13 (equivalent to 16" Round).

Visit Booth 1509
at the Coal Show

Hendrick MANUFACTURING COMPANY

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring — Shur-Site Treads • Armogrids • Hydro Dehazers • Petrochemical Column Internals

41 Dundaff Street Carbondale, Pa.

In Ohio . . . . and the World Over

Bucyrus-Erie Ward Leonard Electric Excavators

KEEP COSTS DOWN . . . KEEP OUTPUT UP

Bucyrus-Erie Ward Leonard electric excavators are helping coal operators everywhere with their modernization plans to boost output while cutting costs. For example, the 150-B shown above is loading unshot coal for the Sunnyhill Coal Co., near Lexington, Ohio.

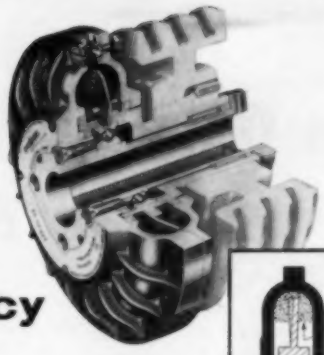
These modern machines are designed to meet today's production problems. The front end has plenty of strength without dead weight — material can be moved with less effort and power consumption. Ward Leonard control provides rapid acceleration and deceleration to help achieve high-speed digging cycles. There is plenty of extra torque and ample usable power when most needed.

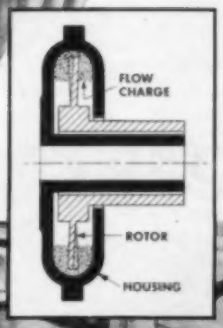
Plan to bring the advantages of these modern shovels to your operations. 91L56

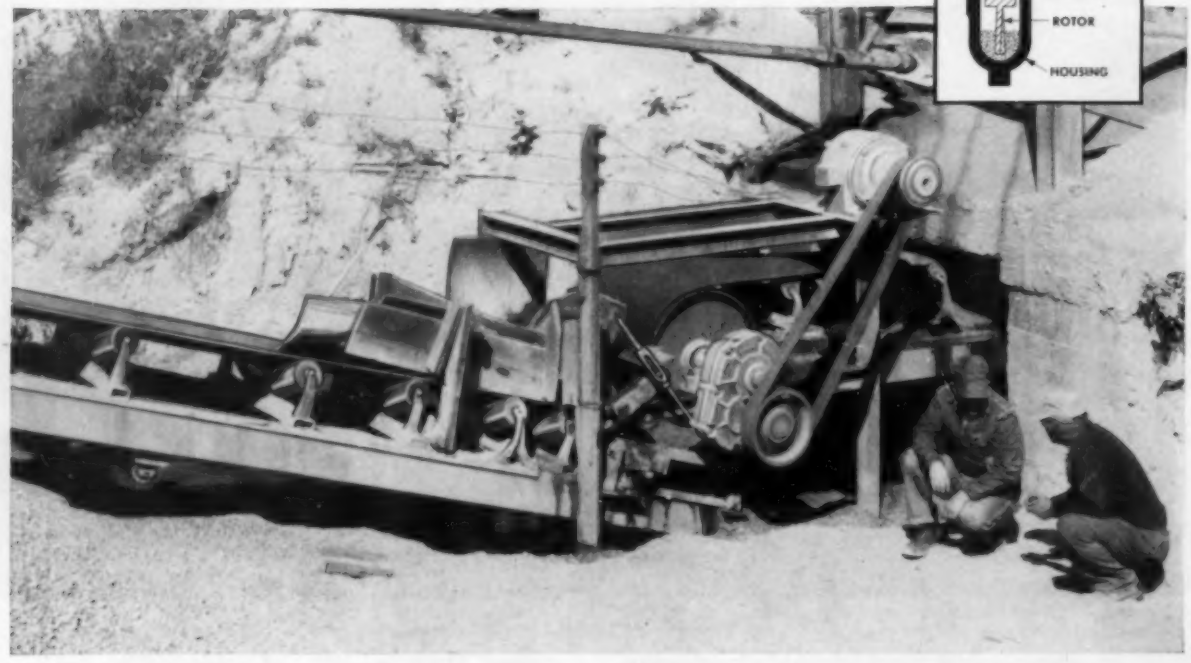
Bucyrus-Erie Company

South Milwaukee, Wisconsin

This new drive starts loads smoothly... with smaller motors ...and gives 100% efficiency at full load!







FLEXIDYNE
THE DRY FLUID DRIVE

This tunnel conveyor, 225 feet long, handles 500 tons of sand and gravel per hour—8 to 16 hours a day.

With Flexidyne, the motor picks up the load easily and smoothly. Power investment is reduced, power costs cut, maintenance simplified and conveyor belts are protected against breakage.

Flexidyne, the Dry Fluid Drive, is the *new* development that starts loads smoothly, that protects against shocks and overloads, that saves power and that gives 100% efficiency at full load!

The "dry fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing, which is keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, wedging it between the housing and the rotor which transmits power to the load.

After a momentary slip between housing and rotor, the two become locked together and achieve full load speed without slip and at 100% efficiency during the running cycle. Changes in weather—hot or cold—inside or out—do not affect operation of Flexidyne.

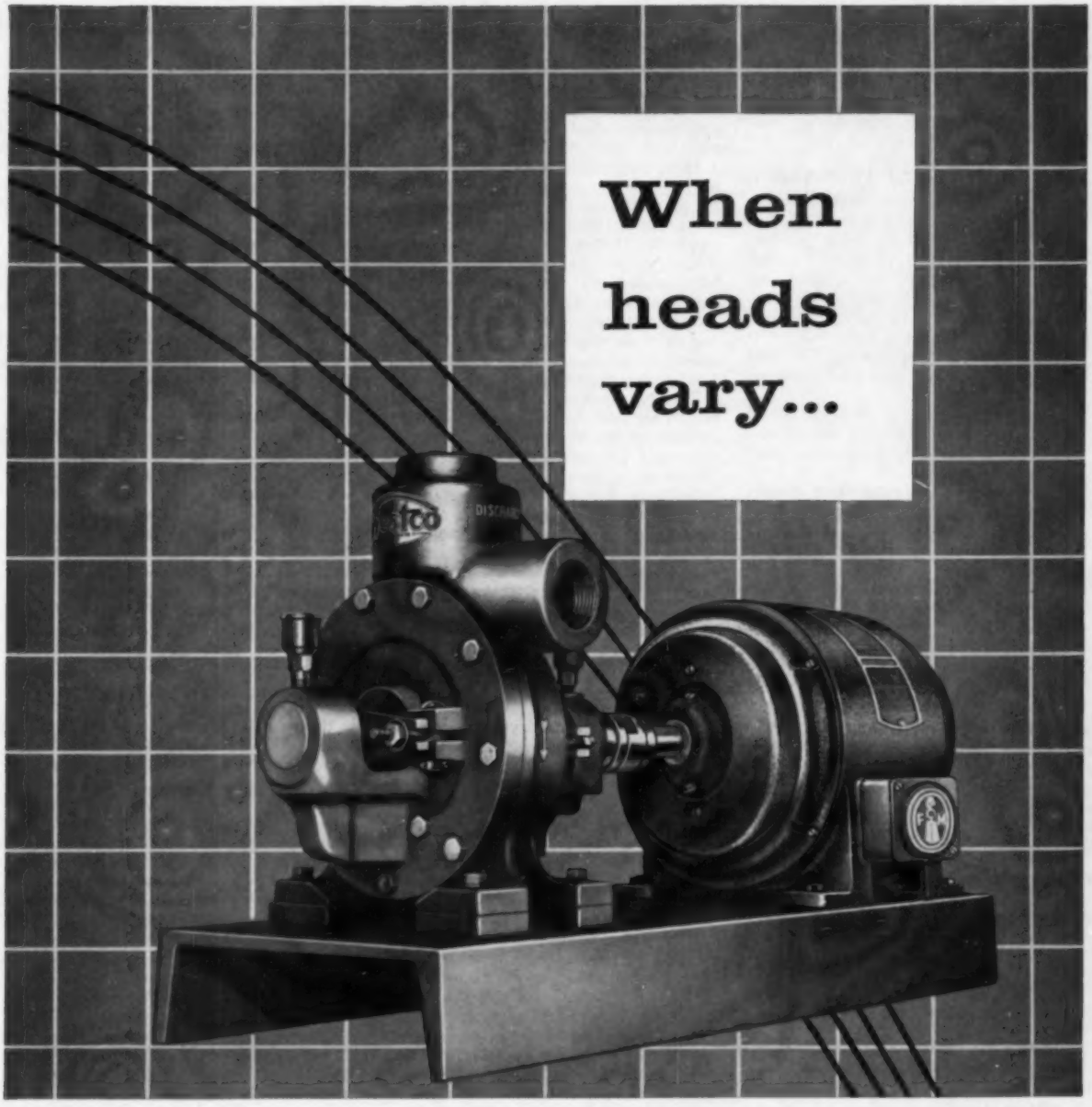
Flexidyne is now available in 8 sizes—for use with electric motors and internal combustion engines from 1 hp to 300 hp. While each size is power rated, the flow charge can be varied at will to give tailor-made torque for your particular job. Write for Bulletin A-640.

DODGE MANUFACTURING CORPORATION
3000 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.

DODGE
of Mishawaka, Ind.

SEE US AT THE COAL SHOW...MAIN EXHIBIT HALL...DODGE BOOTH 906



Install a Fairbanks-Morse Westco peripheral pump . . . and make sure of efficiency with little or no loss of capacity!

How? Through original F-M Westco design—these pumps deliver approximately the same capacity when discharging against high pressure or low pressure—and all at 1750 rpm.! Another important point: by featuring a multi-vaned impeller, these Westco peripheral pumps deliver multi-stage performance from a single-stage pump.

You'll find Westco peripheral pumps ideal as integral parts of machines, units or systems . . . such as circulating hot water, ice water or brine . . . or for service on clear water, sump, solvents or chemical fluids, feeding filters or boilers, or as booster pumps. Capacities to 200 gpm., heads to 600 feet. For complete information and assistance contact your F-M Pump Dealer, or write today to Fairbanks, Morse & Co., Dept. CA-5, 600 South Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

BCR Meeting (*Continued*)

rangement has been, and whether the industry can afford it. If so, you will be gratified to learn that it has actually proven considerably cheaper, in terms of results, for BCR to operate its own laboratories with its own research staff."

THE CURRENT BCR PROGRAM

James R. Garvey, Assistant Director of Research, Bituminous Coal Research, Inc.

"The seeds we have been planting since the fall of 1953, when BCR undertook the conduct of its own research, are beginning to mature. This year I can point to not one but several projects which are now providing positive answers to obstacles that heretofore have stood in the way of increased coal sales in several markets."

Projects in the Survey Stage—Action of solvents on coal; increasing use of coal fines; controlling SO_2 emission in stack gases; mine acid control.

Preliminary Laboratory Test Stage—Controlling coal plasticity for equipment design; in-plant pneumatic handling of coal; electrostatic coal cleaning; the cascade coal dryer.

Laboratory Tests of Production Models—Improved coal-bin design, coal-fired packaged boiler.

Production-Model Field Testing—Fire-jet stoker; stack sprays for dust abatement.

Ready for Production and Use—Crop dryer; Campbell stoker; Stokermatic heater; fly-ash utilization; Coal-O-Matic furnace.

"While all projects either in the use stage or approaching this stage will be beneficial to the coal industry, particular attention is called to the Coal-O-Matic furnace which provides essentially automatic residential heating, the Fire-Jet stoker and the automatic steam generator. These will enable the coal industry to meet the competition of other fuels in the small commercial field which includes schools, churces, etc. The BCR coal-flow device will be applicable to all uses of coal from residential to utility."

RESEARCH AIDS THE RETAILER

R. B. Sechrist, Managing Director, Automatic Solid Fuels Equipment, Inc.

"There are those in the coal industry who have written off retail coal as a lost cause, and they do not hesitate to say so. There are others who are very doubtful as to the future prospects of domestic coal. There are many who are uncertain. It is my belief that no one can possibly know or even estimate what chance of survival and even glory, the retail coal market might have, because we never put a competitive front to try to find out . . .

"I would like to suggest that we do not lose sight of the job we have not done. To those who have written off retail coal, or are undecided in their thinking, I'd like to suggest that it is unfair and unrealistic to decide that that which hasn't been truly tried can't be done. The most flagrant sins of the coal industry in respect to retail coal have been those of omission, not those of commission. People have stopped using coal, not because of what they know about coal as a fuel, but because of what they don't know about it; and that embraces all the shortcomings of the industry from research to field promotion, and publicity and public relations, and all the training and guidance that has not been kept in pace with competitive fuels . . .

How does coal-industry research measure up today? . . . Just a year or so ago, the only hope, or the only approach anyone in the industry had to a prospect for automatic heating for a home, church, school, or any of the buildings in the retail market, was the underfeed stoker—the same unchanged, unimproved, no-longer-interesting underfeed stoker that had been in existance for 25 to 30 yr, since just about the time the model T Ford passed out of existance.

"Today, we have modern equipment, not all we need, but enough to face competition for the first time since the introduction of the packaged oil-burning unit. We have, for the domestic user, a white, baked enamel, modern, completely packaged, integral designed, forced-warm-air, winter conditioning coal-fired unit—self-feeding from a sealed storage bin, and automatic in its ash discharge to a dust-proof sealed container. That is progress. On the commercial front, we have the new Fire-Jet, and very soon, we hope, we will have the package-boiler coal-fired unit with ash removal—the answer to the package oil-fired steam generator. We have re-designed greatly improved underfeed stokers with synchronized coal modulation and combustion air control tied in with automatic damper regulation, all operating in direct response to steam pressure and changing load demands. To sum it up, I'd say that, with the research projects scheduled by BCR and the follow-through that is necessary beyond the laboratory, the retail dealer will have at his disposal, for the first time, the key tools he needs . . .

"Research, however, is not an independent phase, nor is it the sole necessary link in providing satisfactory completion of a project and satisfactory end results. With coal-heating equipment, we are, of course, looking toward complete satisfactory customer heating comfort, with minimum service required. Therefore, between research and the ultimate customer satisfaction are several interlocking and necessary steps:

"Quality controlled manufacture.

"Competent and experienced field personnel.

"Trained, capable, willing dealer participation in installation and service."

HOW COAL RESEARCH HELPED ONE CUSTOMER

E. M. Parrish, General Superintendent, Power Stations Dept., Duquesne Light Co.

"For several years BCR in cooperation with other interested groups has been active in research and study of the applicable uses of fly ash and in these activities has done considerable work in cooperation with the Duquesne Light Co. . . .

"There is another possible development for this interesting material on which some research has been done by BCR and by others. As yet the answer is not in sight . . . If a process could be developed to separate this material into the various elements, a tremendous source of valuable raw materials could be made available since about 6 million tons of fly ash is produced in this country each year.

"I shall now attempt to give some idea of the value of the development of the use of fly ash as a useful commodity to the producers of fly ash, to the public, and to the coal industry . . . For the purpose of this discussion I have assumed that my company will eventually be able to dispose of its entire production of fly ash—and I believe this will be the case.

"The cost of disposal of fly ash is approximately $1 per ton and the average selling price is $1.25. Each ton sold effects a net saving of $2.25. The cost of steam coal of the grade used is approximately $3 per ton in our area. Approximately 10% of the weight of the coal is reclaimed in fly ash, or 1 ton of fly ash for each 10 tons of coal burned. Thus, $2.25 is saved for each $30 spent. This saving amounts to roughly 4.5% of the cost of coal. In view of constantly increasing costs of labor and materials to utility companies, a saving such as this will be of value to utilities in helping them reduce their costs and may even postpone rate increases to customers."

LOCOMOTIVE DEVELOPMENT

P. R. Broadley, Director of Research, and and **W. M. Meyer,** Assistant, Locomotive Development Committee, Bituminous Coal Research, Inc.

"Last year at Columbus we reported that late in 1955 the Locomotive Development Committee approved plans for modifying the locomotive coal system as well as partially reblading the gas turbine rotor. Money was made available early in 1956 and physical changes in the plant were started. The staff was instructed to operate 1,000 hr under the modified conditions, the test operations to be based on 500 hr of high load testing to determine the effectiveness of the alterations. However, 500 hr of locomotive cycle type of operation will be featured to best simulate the railroad locomotive conditions . . .

"A responsibility assigned the staff in 1953 was the development of a new fuel system to handle specification coal as a 'fluid' on a locomotive. This coal system has been developed and constructed and is presently being used in operating the turbine tests at Dunkirk. In this system, 3/16x0 dried coal flows from aerated tanks without need for mechanical conveyors. This crushed coal is delivered by the LDC rotary pump into the conveying air which carries it through the pressurized unit pulverizer to the combustors." The turbine blades were modified and the fly ash separator was improved.

"In general the plant has performed very satisfactorily. Two excellent runs were made, one between Feb. 5 and 8 of 68 hr 17 min and between Feb. 26 and 28, a continuous run of 74 hr 47 min, with final shutdown on account of strike . . .

"Studies are currently under way to

BCR Meeting (*Continued*)

determine the feasibility and applications of the direct-fired coal-burning gas turbine in conjunction with and supplementary to supercharged boiler-generator plants."

COAL-TURBINE POTENTIAL

John W. Igoe, Assistant Director—Administration, Bituminous Coal Research, Inc.

"There are 3,036 non-utility power-generating plants in the United States, of which 2,654 are steam plants and 382 are internal combustion plants. If these plants all used coal-fired gas turbines, they would consume more than 110,000,000 tons of coal per year. It will not be possible to know until the 1954 census figures become available later this year how much of this generating capacity is already coal-based.

"These figures do not include plants operated by the electric utility industry. It should be borne in mind that none of this discussion will refer to the electric utility industry, except to point out that the coal-fired gas turbine has definite possibilities for emergency and peak conditions, particularly in places, where cooling water is scarce. The gas turbine uses no cooling water and very little oil for lubrication.

"We all realize the importance of recapturing the railroad fuel market for coal. It is generally assumed that the coal-burning gas turbine, as developed by the locomotive development program, provides one of the best opportunities to do this. The power generating facilities operated by industrial companies, municipalities and cooperatives, however, offer an additional opportunity for the coal-fired gas turbine to replace plants burning oil and gas. We understand that important companies are already designing equipment suitable for such applications.

"Three years ago Alco Products, Inc., knowing of BCR's interest in the coal-burning gas turbine, requested BCR to study the potential for stationary plant application under Alco's sponsorship. Eventually, BCR's general research program became a co-sponsor. The objective of the study was to evaluate the commercial market potential of coal-burning gas turbines for stationary plants by industry and by state . . .

"We have concluded that the coal-burning gas turbine should have extensive application for power generation in the stationary plant field. Of the 3,036 privately-owned power generating plants, 1,454 are 1,000 kw capacity or smaller; 587 are between 1,000 and 3,000 kw. In other words, more than one-half the total privately-owned power generating plants are equivalent in size or smaller than the coal-burning gas turbine developed by the Locomotive Development Program for railroad motive power; 279 plants are between 3,000 and 6,000 kw, or in the size range which could be handled by two such units, although single units in this size range are under development. Also, 160 more plants in the range of 7,000 to 9,000 kw could be handled by installations of three such units in each plant, and 123 plants could be handled by four such units each.

"The point of this series of numbers is simply that more than two-thirds of the total number of privately-owned electric generating plants are in the range of the coal-burning gas turbine as developed, or a reasonable number of multiple units. Naturally, whether such would be served by individual plants or multiple units of any particular size would be the result of an engineering and economic evaluation for the particular application.

"We learned that four industries had very good possibility for extensive application of the coal-fired gas turbine for generating power. All four would probably have use also for the hot exhaust gases obtainable from the gas turbine. The four industries are: municipally-owned plants, paper and allied products plants, chemical and allied products plants, and plants owned by the primary metals industry . . .

"It is felt by some that eventually most new electric utility and larger industrial power generating plants also will incorporate gas turbines to achieve the important net efficiency-gain possible by the steam and gas cycle combination."

MINING DEVELOPMENT

Gerald von Stroh, Director of Development, Mining Development Program, Bituminous Coal Research, Inc.

"We are told that over the next 25 yr the coal industry must spend the staggering sum of $10 billion to replace worn-out properties and to meet the needs of the expansion of markets which appear to lie ahead. The Mining Development Program, we believe, will contribute substantially to the meeting of this problem and to obtaining the necessary funds . . .

"The Mining Development Program is attacking this job not only from the point of reducing the cost for labor but also in making many attempts directed toward the reduction in capital cost for equipment in the mining of coal. For example, the Mining Development Committee's extensible belt is expected to cost about 30% less than extensible belts now commercially available. A reduction from about $60,000 to $40,000 would be a saving of $20,000 per machine unit, or about 10¢ per annual ton of production. This device should also permit a reduction in the face crew over conventional methods of two men and improve the continuity of the continuous mining machines.

"Temporary roof support involving the use of recoverable beams should save another 10¢ a ton in supply costs for room work or an industry saving of about $24,000,000 per year. Main-line transportation should cause an appreciable reduction in the cost of opening up a new mine and for solving some of the current problems, particularly pertaining to refuse disposal systems. For example, the trolley conveyor developed by the Mining Development Committee will provide the same carrying capacity with a 30% lower capital cost. One refuse disposal system under consideration would require $300,000 by conventional methods and less than $200,000 utilizing a trolley conveyor.

"A new automatic control system for presently existing and available continuous mining machines should provide additional production of 10% which would provide a saving of almost $1 per ton on the capital cost of $8 to $10 a ton for opening up a new property or, putting it more dramatically, reducing the $8 to $10 billion dollar capital outlay required over the next 10 to 25 yr by almost $1 billion. One study under our operations research program and applied to the problem of engineering of coal mines will permit one company to release eleven highly trained technical people for more important work.

"Examples could be multiplied but we believe it is obvious that results in mining research can be of substantial benefit in meeting the problems that lie ahead, both from the point of view of increasing profits by lower cost, as well as by reducing the amount of money necessary to invest to produce a ton of coal."

Coal Patents (*from p 194*)

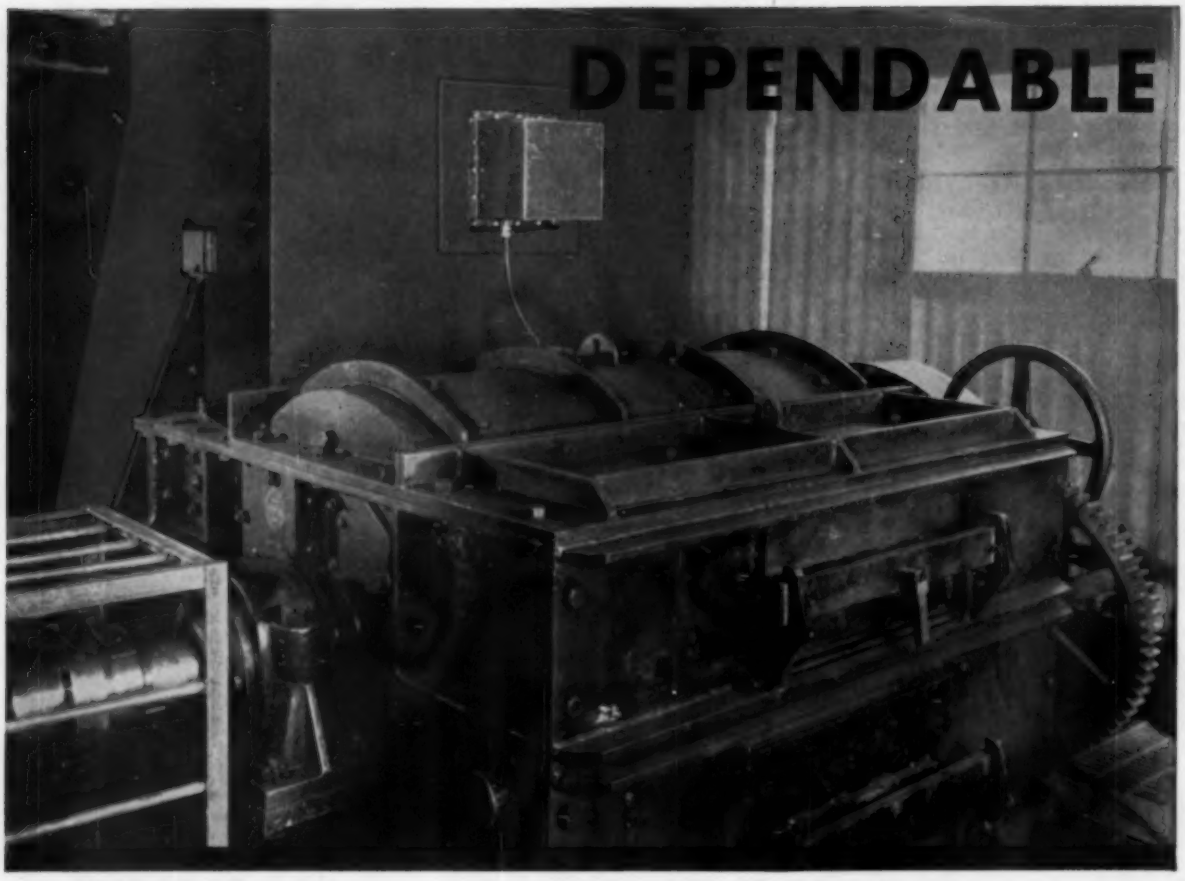
Pittsburgh, Pa.), Apr. 9, 1957. An improved centralizer, or guiding means, for the drilling implement of a rotary auger coal drill. The device is used for reducing lateral vibration or whipping of the steel during the drilling operation. No. 2,788,194.

Continuous miner having disintegrating head mechanism and floor-clean-up means carried on tiltable support, A. L. Barrett (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Apr. 9, 1957. This improved continuous miner is provided with means for picking coal from the floor. No. 2,788,200.

Continuous mining machine having a movable cutting head and movable conveying mechanism, F. A. Lindgren and R. C. Lundquist (assigned to Goodman Mfg. Co., Chicago, Ill.), Apr. 9, 1957. Telescopical conveyor-supporting means is provided between stationary and extensible frames in this low-height coal mining machine. The conveyor may be operated while being extended or retracted. No. 2,788,201.

Disintegrating head mechanism of the plurally articulated type for a continuous miner, A. L. Barrett (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Apr. 9, 1957. An improved disintegrating head mechanism wherein the disintegrating means may first swing in vertical planes about one pivot and thereafter may continue to swing about a parallel pivot. No. 2,788,202.

Hose guide and aligning means for transmitting fluid under pressure over the roll-over joint of a kerf cutting machine, R. A. McCallum (assigned to Goodman Mfg. Co., Chicago, Ill.), Apr. 9, 1957. An improved hose retainer and guide for the pressure transmission of hydraulic fluid from a stationary to a rotatable part of a kerf-cutting machine. No. 2,788,203.



Without a repair or replacement part, this American AC Rolling Ring Coal Crusher reduced over 550,000 tons of minus 8" lignite to a 3/4" product

. . . proof of what American Coal Crushers will do for you.

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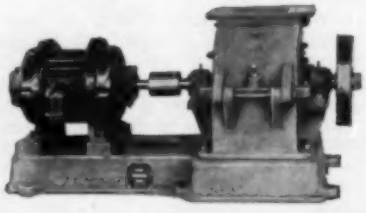
FOR DEPENDABLE SAMPLE CRUSHING

Model 15 x 9 American Sample Crusher with capacity of 2000 lbs. per hour. Write for Bulletin 157.



"When you figure Costs — the best results come from American Rolling Ring Crushers".

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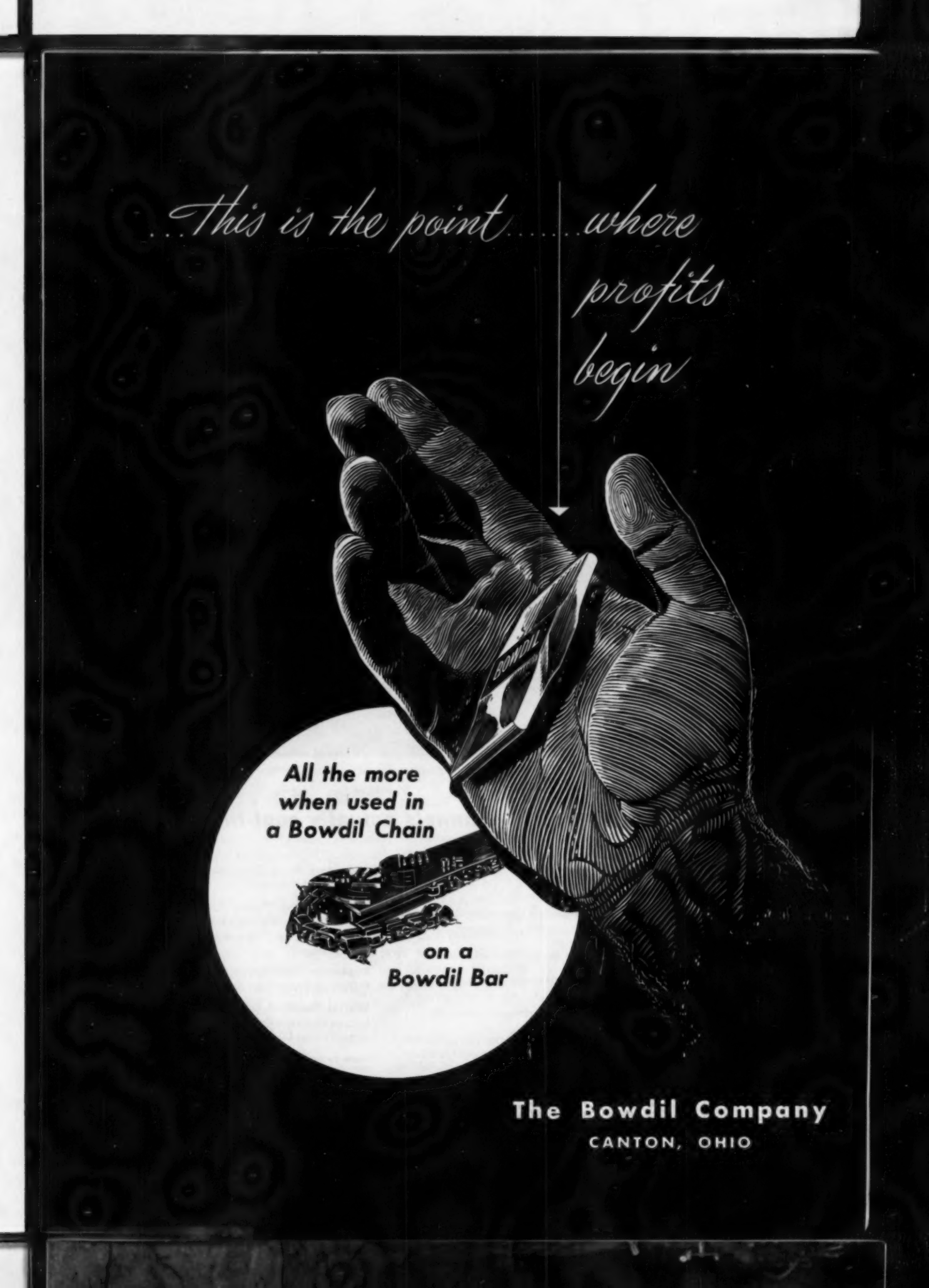

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The Bowdil Company
CANTON, OHIO

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EXIDE-IRONCLAD BATTERIES

Being interviewed is Curtice C. White, Senior Development Engineer.

"These channels actually cool the battery"

At the Exide Laboratories—**Reporter:** First, Mr. White, tell me what makes a battery hot.

White: Heavy loads—they often raise battery temperature as much as 20 degrees.

Reporter: How do the channels cool it?

White: The heated electrolyte rises to the top through the channels. Plates are cooled by electrolyte coming up from the bottom.

Reporter: Don't all batteries have channels?

White: Unfortunately, no. It is the tubular construction of the Exide-Ironclad positive plate that leaves these channels on both sides.

Reporter: What does this feature mean in battery performance?

White: Longer battery life, for one thing. The battery stays cooler. Has less incidence of hot spots. Plates operate at a more uniform temperature.

Reporter: Obviously this is an important feature of Exide-Ironclad.

White: Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

Note to battery users: Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Philadelphia 2, Pa.

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Thermocoal Belting

EVERYTHING THE U.S.B.M. REQUIRES*

...and more!

When you order conveyor belting for underground coal mine use, be sure it's new, fire-resistant Thermocoal—the belt that bears acceptance designation #28-13 of the U.S. Bureau of Mines.

You'll not only have a belt that meets or exceeds all after-flame and after-glow tests . . . you'll also benefit from typical Thermoid toughness. Thermocoal Belts are engineered for high resistance to flexing and impact, edge wear, abrasion and mildew. You can specify either 4 or 6 ply construction of the strongest cotton or cotton-nylon duck—impregnated with specially compounded Thermoid rubber stocks to assure longer life, lower costs.

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... and Hose manufactured with your needs in mind.

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Thermoid Company
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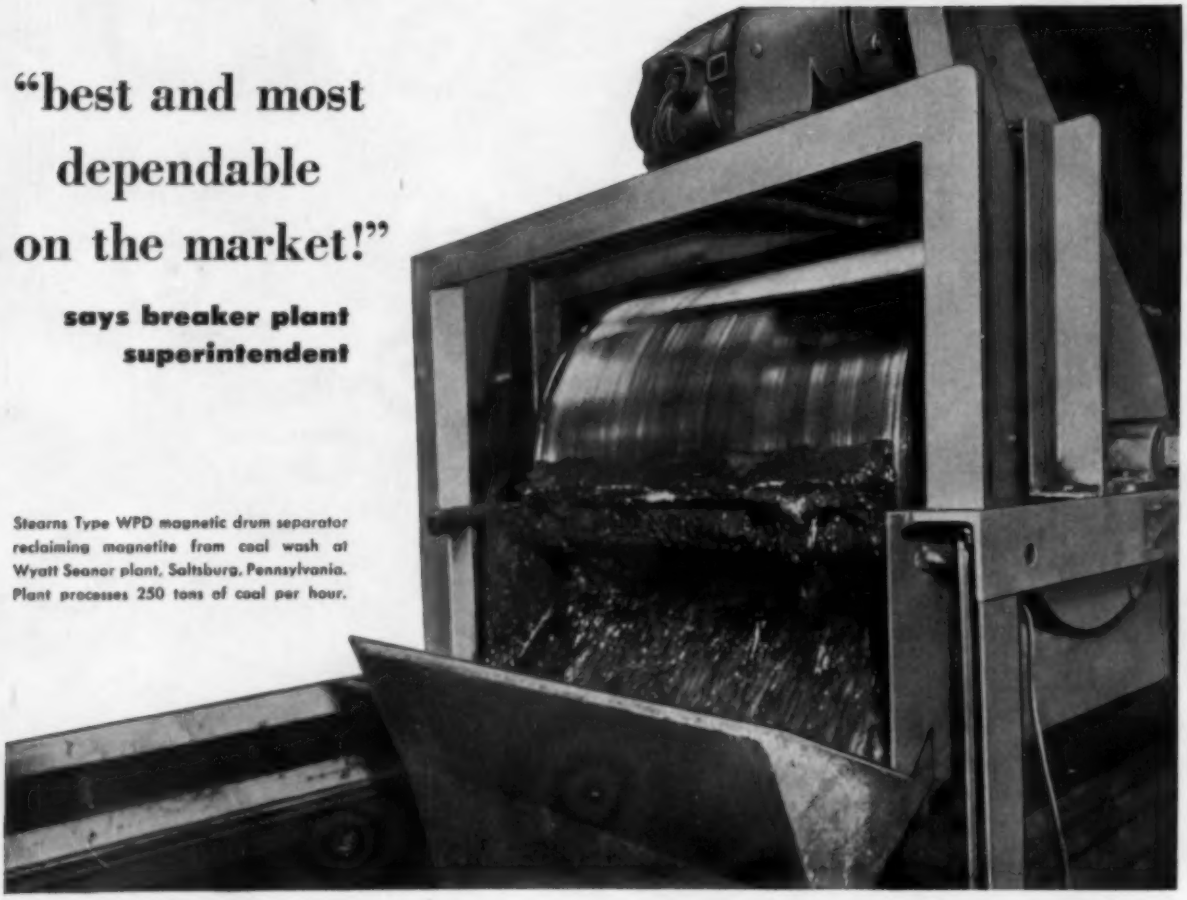
"best and most dependable on the market!"

says breaker plant superintendent



Stearns Type WPD magnetic drum separator reclaiming magnetite from coal wash at Wyatt Seanor plant, Saltsburg, Pennsylvania. Plant processes 250 tons of coal per hour.

STEARNS Type WPD Magnetic Separator for recovery of magnetite

The two-year-old breaker plant of the Wyatt Seanor Company at Saltsburg, Pennsylvania, uses a Stearns Type WPD magnetic separator in the reclamation of magnetite used in coal washing. The success of this installation has earned the confidence of the company in the efficiency of the Stearns unit.

"We'll install Stearns separators when we open our new mine in West Virginia," says Superintendent Rollie Meeks, "because we know Stearns builds the best and most dependable magnetic equipment on the market."

High recovery of magnetite — up to 99.8% on actual tests — is an outstanding feature of the WPD's operation in modern coal plants. The specially-designed permanent magnet assembly provides a deep, powerful field, with ideal flux distribution for positive transport of magnetic particles.

High specific gravity of the discharge, with solids content of 60% or more, permits direct return of the magnetite to the flotation process without densifying.

Learn how Stearns WPD magnetic separators can increase efficiency in heavy media coal processing. See your Stearns representative, or write for Bulletin 2011-C. 41

Visit Stearns at the
COAL SHOW IN CLEVELAND
May 13-16
Booth 329-331

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"Your cars custom-engineered for your specific needs"

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BETTER FRAGMENTATION with Spencer Prilled Ammonium Nitrate now permits stripping units to move up to 25% more material. Read below why Spencer Prills are superior to other types of nitrate solids!

Cut Blasting Costs 50% with Spencer Prilled Ammonium Nitrate

Independent laboratory tests prove that porous structure of Spencer product develops more effective and higher speed blast.

Because ingredients cost less, and the mixing process is so much simpler, blasting costs can be cut up to 50% by using Spencer Prilled Ammonium Nitrate. At the same time, this product produces better fragmentation, yielding up to 25% more material.

The basic ingredient is Spencer Prilled Ammonium Nitrate. Impartial laboratory tests have now proved that the porous structure of these prills makes them the most effective and highest-speed blasting agent of any manufactured nitrate solid. This conclusion has been further verified by extensive field tests.

More even distribution made possible by the prills is one important reason for the superiority of Spencer Prilled Ammonium Nitrate. And, since the deflagration of a solid explosive is layer by layer from the surface of the particle, the additional surface available on the prill speeds up decomposition.

Contrary to popular opinion, the lesser bulk density of prilled ammonium nitrate actually *increases* rather than decreases the energy of the explosion. This fact is verified, not only by such an authority as the ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY, but also by comparative field tests. And more intense explosion means better fragmentation.

Not explosive in its normal form, Spencer Prilled Ammonium Nitrate can be handled safely, and because the mixing operation is so simple and safe, it can be done right at the mine location.

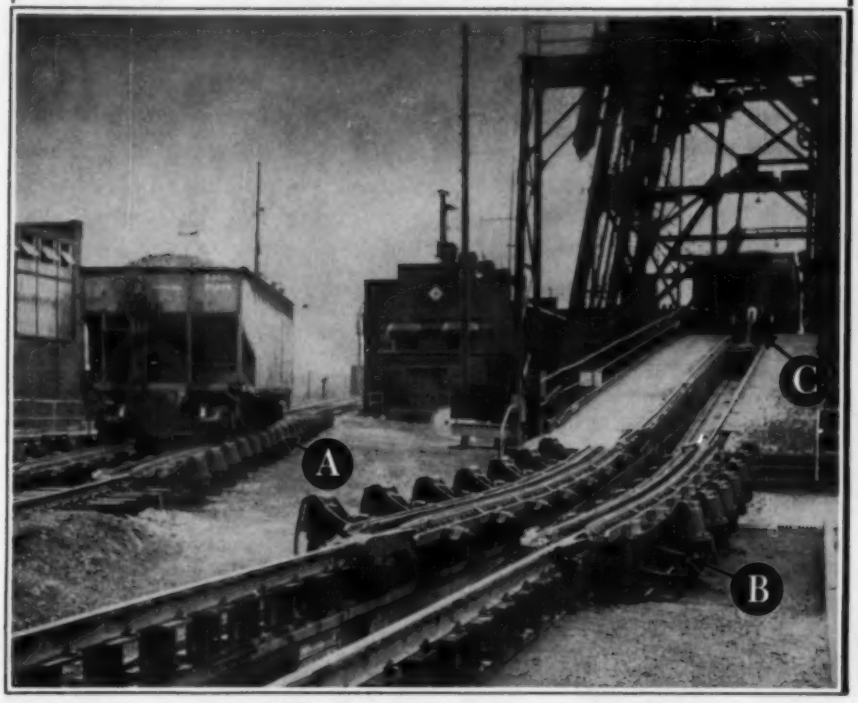
As supplier of the original nitrate used in the early stages of developing the Akremite Blasting Process, Spencer Chemical Company has been closely associated from the very beginning with this project to create less expensive blasting techniques.

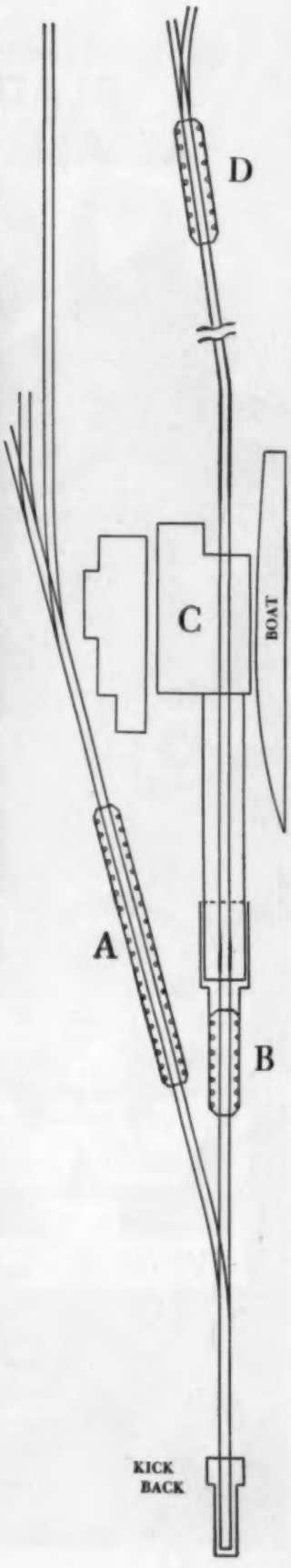
For more specific information about low-cost blasting for coal, iron, limestone or construction, write to Spencer Chemical Company. We will be glad to supply you with any needed technical assistance or service.

SPENCER CHEMICAL COMPANY

610 Dwight Bldg. • Kansas City 5, Mo. BAltimore 1-6600

FAST AND EFFICIENT MATERIALS HANDLING—Loaded coal car rolls down the incline on the left at about 15 miles per hour. Its speed is reduced automatically in car retarder (A) so that it rolls up a "kick back" at just the right speed to send it back to retarder (B) where it is stopped automatically. A "barney" then pushes the car up the slope to the car dumper (C) where coal is unloaded directly into the ship. The next full car pushes the empty car off the dumper. It rolls down through retarder (D) to the proper track. All this is done by push-button control.





Automation with UNION CAR RETARDERS cuts costs on coal-loading dock

Forty carloads of coal an hour can be loaded on shipboard with this coal-handling system at a Lake Erie coal dock at Conneaut, Ohio.

This job formerly required a crew of men riding the cars and working the hand brakes—a hazardous occupation. Insurance rates were high and frequently men had to wait for the next ship to be loaded.

Now the work is handled quickly and safely by a push-button system using UNION Electro-Pneumatic Car Retarders. Costs have been greatly reduced and hazards eliminated.

If you have a materials-handling situation involving many carloads of coal, ore or other products, let us show you what can be done with automatic car-retarder systems to increase efficiency and reduce costs. Write for complete information.

UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY
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3 models
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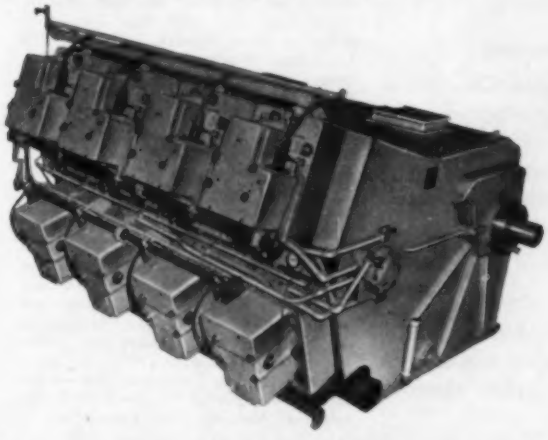
DRAGLINE-PROVED PAGE HORIZONTAL V-TYPE DIESEL



The Page Engines powering 700 Series Draglines are designed specifically for dragline work . . . to work longer, at lower cost, with less downtime and maintenance than any other engine. Big bearings, big pistons, a short, stiff crankshaft and slow (450 RPM) speed are only part of the story of why many Page Diesels are still producing maximum horsepower after 20 years of operation. Bulletin WDSD-155 has full details.

Page 700 Series Draglines are rugged, compact, workhorse machines. They are designed and built with the fastest practical hoist and swing speed to reduce cycle time and increase yardage.

The Page 700 Series Dragline is proof that a fast, efficient, medium-sized machine will *consistently* outperform larger, but slower machines in virtually every kind of digging.

In addition, initial investment for a Page 700 Series Walking Dragline is considerably smaller, and operating and maintenance costs are lower. *Want more details? Write for Bulletin WDSD-155 today. There's no obligation.*

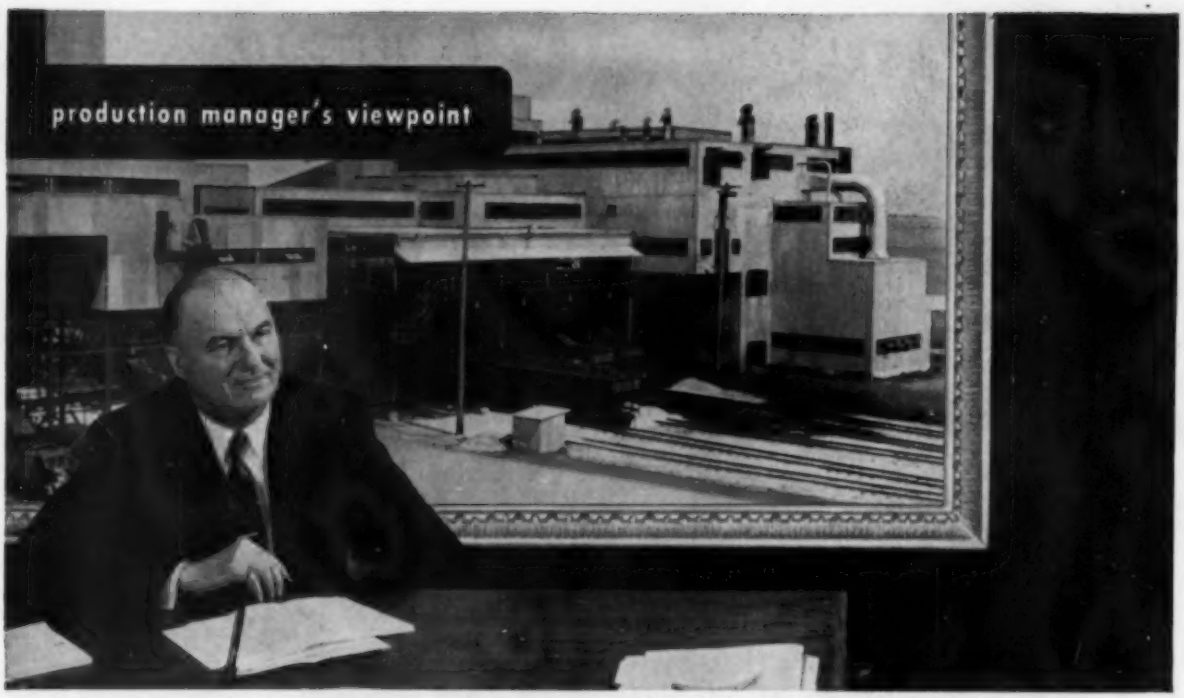
PAGE ENGINEERING COMPANY
CLEARING P. O.—CHICAGO 38

Page

Automatic Dragline Buckets
Walking Draglines

W-2001

If it's a PAGE... *It* DIGS



F. EARLE SNARR, VICE PRESIDENT-PRODUCTION OF FREEMAN COAL MINING CORPORATION SAYS

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When building a new preparation plant today we feel we cannot afford to have costly and time-consuming "bugs" upon completion, due to errors in planning. For this reason we like to employ engineers who are specialists in coal preparation plants. This method, we feel, gives us the benefit of broad knowledge and practical experience in methods and manufacturer's products to implement each process.

Tons of steel and its artful fabrication are important, but we prefer to look over the roster of a company's specialized personnel, its record of achievement and resourcefulness in its field.

We want tomorrow in every plant we build today.

F. Earle Snarr

F. Earle Snarr, Vice Pres., Production Freeman Coal Mining Corp

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The executives in charge of our engineering, coal preparation, construction and design departments, have spent a total of 300 years in the coal industry.

It's What We Do That's Important

Although Roberts & Schaefer Co., for fifty-two years, has been recognized as one of the pioneers in perfecting and manufacturing coal preparation plants, our services are not contingent upon what we make or sell.

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It is this unbiased viewpoint in our recommendations that has contributed to the successful operation of many of the largest and most modern preparation plants in the world.

EXPERIENCE

William C. McCulloch
Coal Preparation Manager

1922 Coal Washing Engineer Pacific Coast Coal Co. 1924 U.S. Bureau of Mines as Coal Mining Engineer. 1925 Laboratory Manager for Heyl & Patterson, Inc. 1930 Chief Chemist for Koppers Rheolaveur Co. 1935 Preparation Manager, United Electric Coal Companies. 1941 Coal Preparation Manager, Roberts & Schaefer Co. Holds master's degree in Coal Mining Engineering from University of Washington. U.S. Bureau of Mines fellowship at Northwest Experiment Station, Seattle, Washington. Member of American Institute of Mining Metallurgical and Petroleum Engineers, Illinois and West Virginia Mining Institutes and charter member of Illinois Society of Coal Preparation Engineers and Chemists. Member of Coal Advisory Committee of Illinois Geological Survey and recently member of the panel on Preparation of National Coal Association.

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Drivers get set to "hit the road" with the first of the 1000 new Power Giants ordered by Ryder System, Inc.

Dodge awarded 1000-truck order

"We picked these Dodge Power Giants to give our truck-lease customers the finest hauling and delivery operation at lowest cost", James Ryder (right), president of Ryder System, Inc., tells Lee F. Desmond, vice president of Dodge.

Ryder System, Inc., world's largest exclusive truck-leasing company, puts low-cost operation first... picks Dodge for record order

When your business is leasing trucks, there's only one way to make it pay off. And that's by keeping your operating costs per mile at rock-bottom levels. That's why Jim Ryder, president of Ryder System, Inc., decided on Dodge when he needed new trucks. He knew that Dodge trucks are built to take extra miles without extra costs.

For instance, new Dodge *Power Giant* V-8's are the most powerful of the low-priced three. And that extra power lets you handle the ruggedest hauling jobs with less engine strain. Less strain means less wear and, of course, fewer repairs. Exclusive Power-Dome design delivers premium performance on regular gas, too. "I save money both ways", says Jim Ryder. "But more important, I know that my customers will be thoroughly satisfied with any Dodge *Power Giant* they lease."

Why not do as Jim Ryder did . . . check into the facts with your Dodge dealer. You'll find a Dodge *Power Giant* will pay off for you, whatever your business.

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Most Power of the Low-Priced 3

SIMPLEX MINE JACKS

6 WAYS BETTER

- ★ Ratchet lowering lever type for speed with safety
- ★ 5-tons capacity (other models to 35 tons)
- ★ Double-lever sockets permit lifting in close quarters
- ★ Full capacity on cap *OR GROOVED* toe
- ★ Safety Speed Trigger
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SIMPLEX JACKS

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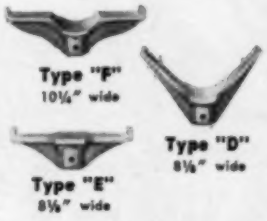
MODEL NO. 642
LIFTS 6 TONS

Combines safety of screw jack with fast action of crank. Head swivels. Five models with min. ht. from 3'6", max. ht. to 9'6".

3 TYPES OF HEADS



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New Parker HOZE-LOK fittings no skiving...easier to use!

- New re-usable *Hoze-lok* fittings for single- and double-wire braid rubber-covered hose are easy to make up. You don't have to strip off the hose cover . . . you can even assemble most sizes with only a hand wrench.
- Two simple steps: (1) dip end of hose in light grease, such as Parker *Threadlube*, and turn counterclockwise into socket; (2) dip nipple in *Threadlube* and screw into socket and hose.
- *Hoze-lok* holds beyond hose-bursting pressures . . . under severe vibration.
- Ask for NO-SKIVE *Hoze-lok* Catalog 4433.

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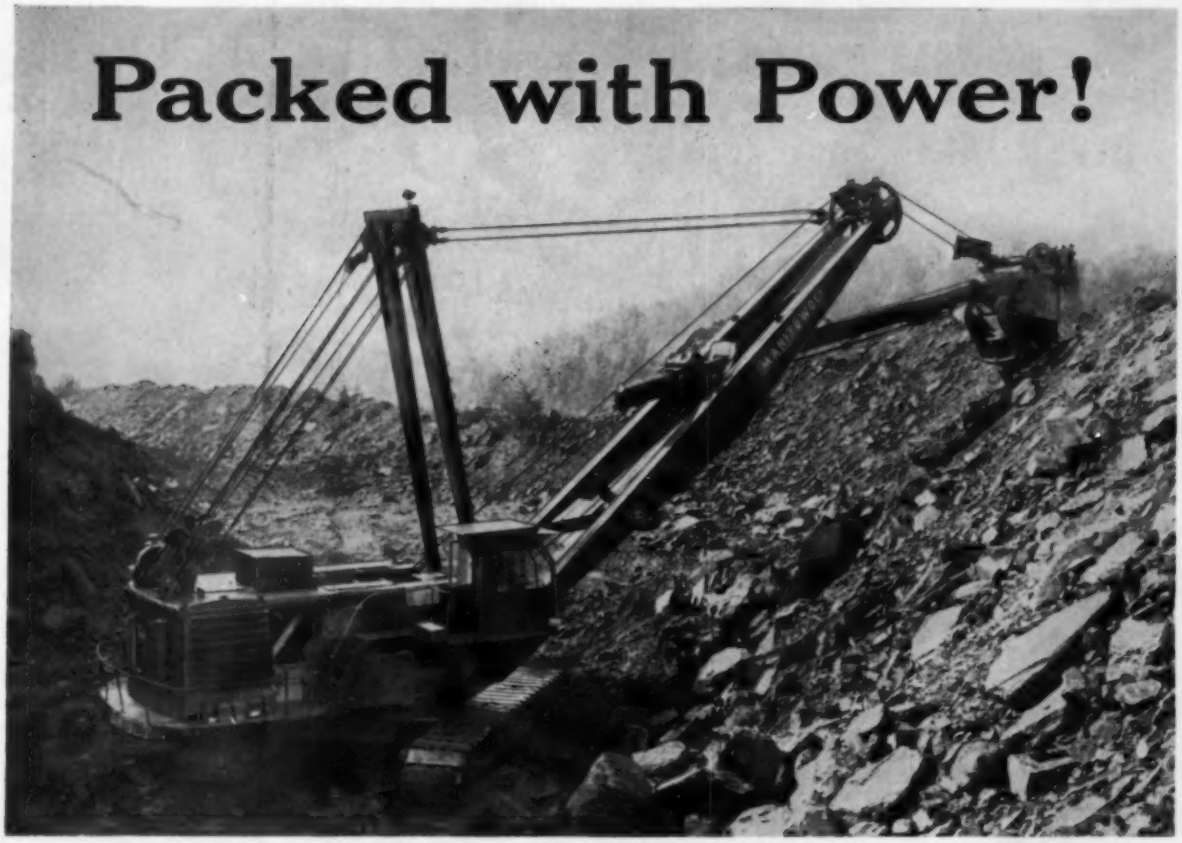

Manitowoc 4500 Boosts Mining Output

Smart mine operators with an eye on output figures have found that the Manitowoc 4500 loads out more tonnage faster — at greater profit. Here's a true mining machine — always ready to increase output — either as a 5½-yd., big capacity shovel, or a long reach, 6-yd. dragline.

FIRST WITH UNIT DRIVE. The Manitowoc 4500 is powered by a single diesel engine instead of independent electric motors and accessories. You get greater operating efficiency — less power loss with unit drive, pioneered and developed by Manitowoc for large crawler excavators.

UNMATCHED SIMPLICITY. You're rid of all the headaches and special maintenance problems brought on by electric drive. Several electric motors, generators, control boards and thousands of electric wires and connections are eliminated. Your regular mechanics easily handle routine maintenance and servicing.

"SMALL MACHINE" MOBILITY. Working range on the job is extended because there's no restrictive trailing cable — no need to stay close to power installations. When moving between jobs, the unit can be shipped on railway cars or highway trailers — then set up, ready to go, in less than a week.

Discover why more and more mines are switching to Manitowoc — Contact your distributor now!

Manitowoc Engineering Corp., Manitowoc, Wis.

- **Simple Design Throughout for Full Power — Less Deadweight — Less Downtime**
- **High Lift Booms Extend Reach and Height**
- **Tubular Dipper Stick Evenly Distributes Digging Strain**
- **Only 15 Gears and Sprockets — Only Working Gears Turn**
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- **Torque Converter Drive — Air Controls — Eliminate Operator Fatigue**

MANITOWOC

SHOVELS 1 - 5½ YD. Speedcrane CRANES 20-100 TON

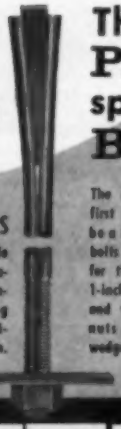
Get DOUBLE EXPANSION for DEPENDABLE roof support with PATTIN roof bolts and expansion shells

The unique double expansion feature of all Pattin expansion shells insures *dependable* roof support, in hard or soft roof conditions. Their double holding power guards against failure — even under a 20 ton pull!

Pattin features include a parallel contact with the hole, and no definite drilling depth is required, as the shell can be securely anchored at any place in the hole. They anchor solidly and will not turn while being tightened. Wedge and shell are assembled in a manner to prevent loss of parts in handling, and the bolt and shell assembly are furnished as a complete unit. Plates are bundled separately. No special nuts or ears are required on the bolts. These features make a safer roof — and a safer roof means fewer accidents, increased production, more clearance for equipment operation and better ventilation.

Pattin specializes in roof bolting—it's our business, not just a sideline! Your business is important to us, and our service engineers are always available for consultation on your roof problems—ready to give you service when you need it! WRITE OR PHONE US TODAY for complete details.

Reg., U.S. and foreign Pat. Offices



The PATTIN split-type BOLT

The split-type bolt is one of the first slotted bolts, and continues to be a favorite wherever split-type bolts are used. Many mines still prefer this type. The bolt is a full 1-inch in diameter, with cut threads and furnished with hex or square nuts and various size plates and wedges.

IN WESTERN STATES

Pattin expansion shells are available and serviced exclusively by Colorado Fuel and Iron Corporation, Denver, Colorado. Western mining companies should contact them direct for information and consultation.

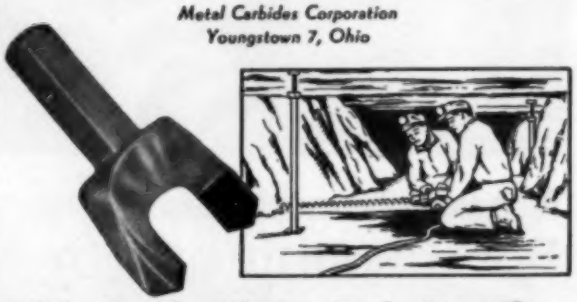
PATTIN
MANUFACTURING COMPANY
MARIETTA, OHIO

The PIONEER of roof bolting . . . established 1888

SUPERSET CORE BITS

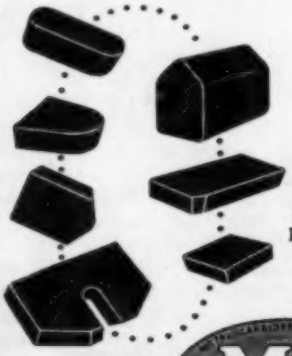
● Mining contractors, ore prospectors, coal operators and construction firms are realizing tremendous savings by taking advantage of our **exclusive fabrication service!** Contractors send us the necessary diamond stones from their own stocks—we hand set them in a super-hard tungsten carbide crown and braze to the threaded steel blank. Hand-set bits assure the proper positioning of each diamond stone to achieve maximum cutting efficiency. The carbide matrix holds the diamond stones until entirely used up. These advantages mean lower drilling costs to you. We can also supply complete core bits or salvage the stones from used bits at nominal cost. Supplied in standard sizes EX, EXE, AX, BX, NX, etc.

Metal Carbides Corporation
Youngstown 7, Ohio



Talide Tips for Mining Tools Give These 3 BIG ADVANTAGES . . .

1. EXTRA STRONG
2. SUPER HARD
3. SHOCK RESISTANT



● A complete line of low-cost, high-quality Talide Tips is offered fabricators and users for tipping machine bits, rock bits, drill bits, roof bits and open-pit bits. All Talide Tips have a special surface finish that facilitates brazing. Non-standard shapes and sizes quoted on request.

TALIDE
YOUNGSTOWN 7, OHIO
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HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

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The Newest of the New...

Dart Model E of 1 ton capacity, built in 1917. Retired from active service in 1950.

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Since 1903 DART has built standard and custom designed trucks to meet every haulage requirement.

Fleets of DART Coal Haulers are at work in many of the nation's foremost mines. They are reducing haulage costs and raising efficiency. It will pay you to investigate how DART Coal Haulers can be more profitable in your operations.

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Booth 2151

DART TONNAGE ENGINEERED TRUCKS

Kansas City 8, Missouri

SUBSIDIARY OF THE CARLISLE CORPORATION

128

Typical Installation on Main Haulage

- Rugged.
- Low in Cost.
- Easy to Install
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TRACK SWITCH THROWER ELECTRICALLY OPERATED

This modern track switch is thrown swiftly and safely by motormen as they sit in their cabs. It saves time and money, and is fool-proof and dependable!

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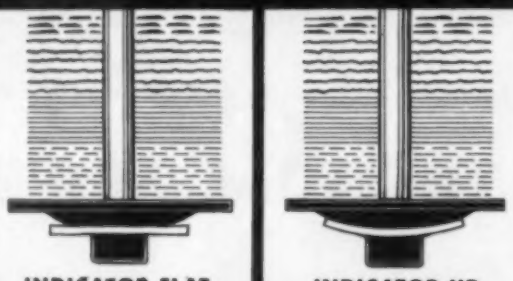
How are your ROOF BOLTS holding?



INDICATOR FLAT
8000 lbs. tension—yellow indicator
6000 lbs. tension—white indicator

INDICATOR UP
Tension has been lost

* SEE US AT BOOTH 916 *
1957 COAL SHOW -- CLEVELAND, OHIO

AMERICAN MINE SUPPLY COMPANY
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A copy of this quick-reading, 8-page booklet is yours for the asking. It contains many facts on the benefits derived from your business paper and tips on how to read more profitably. Write for the "WHY and HOW booklet."

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WEMCO First Choice For Flotation

Proved in Metallic Flotation

Proved in Non-metallic Flotation

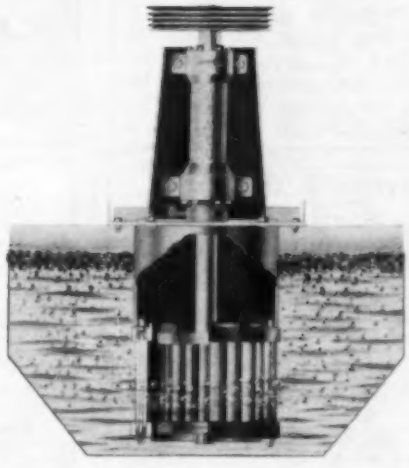
Now proved in Coal Flotation!

Treatment of fines no longer need be a problem in modern coal-washing plants, with performance-proved Wemco Flotation machines on the job.

More and more coal operators every day are discovering the many bonus benefits offered by these coal-engineered Wemco flotation units . . . and all agree there's no better way to increase tonnage and lower costs at the same time.

Check these outstanding features of Wemco Flotation Machines:

- **Larger tonnage per cell volume**
- **Lower cost per ton**
- **Simpler mechanism**
- **Lower operating costs**



Wemco Flotation machines utilize a high-intensity mixing system with proven air control features, providing optimum coal attachment to floated bubbles and maximum drop-out of ash material. The unique rotor-stator principle assures faster flotation, greater flotation recovery, and unmatched overall efficiency.

For additional information, check with your WEMCO representative or write:

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Representatives in principal cities of the United States and in Canada and in major countries throughout the world.

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he's working for you

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THE MAN WE MEAN IS A COMPOSITE of the editorial staff of this magazine. For, obviously, no one individual could ever accomplish such a vast business news job. It's the result of many qualified men of diversified and specialized talents.

AND, THERE'S ANOTHER SIDE TO THIS "COMPOSITE MAN," another complete news service which complements the editorial section of this magazine — the advertising pages. It's been said that in a business publication the editorial pages tell "how they do it" — "they" being all the industry's front line of innovators and improvers—and the advertising pages tell "with what." Each issue unfolds an industrial exposition before you — giving a ready panorama of up-to-date tools, materials, equipment.

SUCH A "MAN" IS ON YOUR PAYROLL. Be sure to "listen" regularly and carefully to the practical business information he gathers.

McGRAW-HILL PUBLICATIONS

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

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$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.
POSITION WANTED undisplayed advertising rate is one-half of the above rate payable in advance.
BOX NUMBERS count as 1 line additional.

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DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals). EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches to a page.

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The advertising rate is $12.50 per inch for Equipment and Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

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Send New Advertisements or Inquiries to Classified Advertising Div. of Coal Age, P. O. Box 12, New York 36, for June issue closing May 17

Replies (Box No.): Address for office nearest you
c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

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Electrical-Mechanical Engineer—Large anthracite coal mining operation northeastern Pennsylvania, to take responsible charge design, construction and maintenance. Mining experience desirable but not required. Submit qualifications, experience, personal status and salary expected. P-4886, Coal Age.

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For Sale

Fully equipped deep mine. Good Market Area. Mine in operation. Contact Thomas Howells

R. D. #5, Salem, Ohio

Proven COST REDUCTION PROGRAMS
for the Coal Industry
HELMICK & ASSOCIATES
9619 LAKE SHORE BLVD. CLEVELAND, OHIO

Your inquiry will have Special Value . . .

If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

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1—24" x 24" Jeffrey Single Roll
1—30" x 30" Jeffrey Single Roll

COAL CUTTERS
5—Goodman type 112 shortwall, A.C.
1—Sullivan type 7B super-shortwall, A.C.
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6—Sullivan type CE-7, A.C.
1—Jeffrey type 28-A, A.C.

SHAKER CONVEYORS
7—Goodman type G-20
6—Goodman type G-15
1—Joy type UN-17
4—Vulcan type 25/30

CHAIN CONVEYORS
1—Jeffrey 61-HG face conveyor
1—Jeffrey 61-W room conveyor
1—Jeffrey 61-EW elevating conveyor

PICKING TABLES
1—30" x 41'6" Card pan conveyor loading boom, two sections
1—48" x 51' Card pan conveyor loading boom, two sections

BATTERY LOCOMOTIVES
3—3½-4 ton Mancha, 24" ga.
1—4 ton Westinghouse, 24" ga.
1—4 ton Ironton 36" ga.
2—6 ton General Electric, 36" ga.
2—7 ton General Electric, 36" ga.
1—7 ton Atlas—36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, 36" ga.
2—8 ton Goodman, 36" ga.
4—10 ton Atlas, 36" ga.

TROLLEY LOCOMOTIVES
2—10 T. Jeffrey, 42" ga.
1—13 T. Goodman, 42" ga.
1—13 Jeffrey, 42" ga.
1—15 T. Jeffrey, 42" ga.

SHUTTLE CARS
1—Joy model 6OD3P, battery operated
7—Joy model 6OD1, battery operated

MINE FANS
1—120" Joy La-Del axial flow fan, model L-14
1—7' Jeffrey aerodyne 2 stage fan

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2900 Brighton Blvd., Denver, Colorado

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2—WK-3B Sullivan air compressors, 110-CFM, track mounted, complete with 250-V, DC, permissible motors and controls.
1—Ingersoll-Rand stationary air compressor, 300-CFM, complete with 100-HP, 3-ph. motor, receiver, and all controls.
1—Universal stone crusher, size 1020, 40-HP motor.
Acme Industrial Equipment Inc.
PO Box 1107, Morgantown, W. Va. Phone 5784

WANTED TO BUY
300 ft. of 36 inch Belt, 4 or 5 ply
1—8 BU Loader and
1—5 SC Shuttle Car, 250 Volt D.C.
REESE COAL CO.
JASPER, INDIANA
Phone 465

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5480 Marion Electric 15 yd. Shovel
1600 P&H Electric 6 yd. Shovel
2400 Lima 6 yd. Standard Shovel
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120-B Bucyrus Erie 4 yd. Shovel
111-M Marion 3 yd. H. L. Shovel
1201 Lima 2½ yd. H. L. Shovel
955 P&H 2½ yd. Standard Shovel
3500 Manitowoc 2 yd. H. L. Shovel
Unit 1020 ¾ yd. Shovel
625 Page Diesel Drag, 160', 9 yd.
6160 Monighan Drag, 160', 8 yd.
625 Page Diesel Drag, 150', 10 yd.
4500 Manitowoc Drag, 140', 4½ yd.
621-S Page Diesel Drag, 135', 6 yd.
7200 Marion Diesel Drag, 135', 5¾ yd.
621-S Page Diesel Drag, 125', 7½ yd.
7-W Monighan Elec. Drag, 120', 7 yd.
618 Page Diesel Drag, 120', 5 yd.
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2400 Lima Dragline, 110', 6 yd.
111-M Marion Diesel Drag, 80', 5 yd.
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1201 Lima Dragline, 85', 3 yd.
955 P&H Dragline, 90', 2½ yd.
802 Lima Cranes
604 Lima Cranes
100-B Comb. Elec. Drag & Shovel
1201 Lima Comb. Shovel & Crane
51-B Bucyrus Erie Shovel & Drag
38-B Bucyrus Erie Shovel & Backhoe
4500 Manitowoc H. L. Shovel Attachment
600 Reich Heavy Truck Mounted Rotary Air Drills
McCarthy Coal Auger Drill
Mayhew Rotary Truck Mounted Air Drills
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Save up to $3,000 on one of our unused Army trucks. See for yourself how TWO of our trucks cost you even LESS than *one* new truck.

Compare our Tandem Axle Trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere.

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We carry a large stock of rebuilt and guaranteed transformers, and invite your inquiries.

Custom-built transformers and coils manufactured to your specifications.

Expert Repair Service—all makes and sizes of transformers rewound, repaired and redesigned. Ask for our price schedule.

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5322 Hetzel St. Cincinnati 27, Ohio

40 Years' Dependable Service

Save on Your INDUSTRIAL TRACK

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FOSTER QUALITY **RELAYING RAILS**

Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.

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PHONE 121 or 42 DUGGER, INDIANA W. M. HUNLEY

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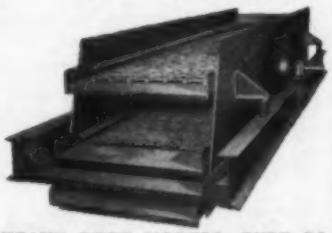
BONDED EQUIPMENT BARGAINS

NEW CURRENT MODELS — IMMEDIATE SHIPMENT FROM OUR FACTORY—WRITE, WIRE OR PHONE

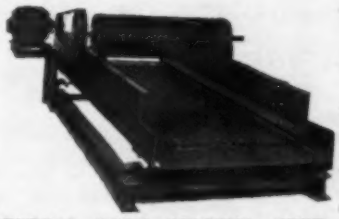
NEW BONDED® HEAVY DUTY VIBRATING SCREENS



HEAVY DUTY MODELS, TYPE BS: Four bearing positive throw eccentric shaft: 3' x 6" to 5' x 14', 1 to 5 decks. Write for New 8-page Bulletin No. 1087.

Model Number	Screening Area	No. of Decks	Sale Price
124AS	2' x 4'	1	$ 443
224AS	2' x 4'	2	472
126AS	2' x 6'	1	472
226AS	2' x 6'	2	501
136AS	3' x 6'	1	581
236AS	3' x 6'	2	688
336AS	3' x 6'	3	956
138AS	3' x 8'	1	675
238AS	3' x 8'	2	815
338AS	3' x 8'	3	996
336BS	3' x 6'	3	1303
436BS	3' x 6'	4	1447
138BS	3' x 8'	1	1231
238BS	3' x 8'	2	1282
338BS	3' x 8'	3	1375
248BS	4' x 8'	2	1865
348BS	4' x 8'	3	2035
2410BS	4' x 10'	2	1953
3410BS	4' x 10'	3	2305
2412BS	4' x 12'	2	2319
3412BS	4' x 12'	3	2635
4412BS	4' x 12'	4	2833

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



GENERAL DUTY SCREENS, TYPE AS: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for New 8-page Bulletin No. 1086.

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam., tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

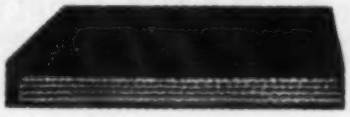
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting. Write For Bulletin #1138.

For 14" belt	$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

Bonded Troughing Idler Conveyors are also available with Truss Type Construction. Write for descriptive information and prices.

NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck 1/8" top rubber cover by 1/32" bottom cover 12# to 15# average friction pull; 600# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	Ply	List Price	Sale Price
14"	4	$3.52 foot	$2.83 foot
16"	4	3.96 foot	2.97 foot
18"	4	4.38 foot	3.29 foot
20"	4	4.83 foot	3.80 foot
24"	4	5.68 foot	4.26 foot
30"	4	6.97 foot	5.21 foot
36"	4	8.26 foot	6.18 foot

A high grade of heavy duty 4 and 5-ply 28 oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting. For more severe service, high tonnages and abrasion resistant. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

Width	Ply	List Price	Sale Price
16"	4	$4.71 foot	$3.46 foot
18"	4	5.23 foot	3.83 foot
20"	4	5.73 foot	4.37 foot
24"	4	6.74 foot	4.94 foot
30"	4	8.28 foot	6.07 foot
24"	5	7.90 foot	5.78 foot

The following belts are 5-ply, 32 oz. duck:

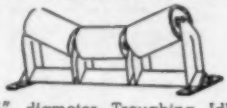
Width	Top Cover	Bottom Cover	List Price	Sale Price
24"	1/8"	1/16"	$ 8.56 Ft.	$ 6.42 Ft.
30"	1/8"	1/16"	10.52 Ft.	7.89 Ft.
36"	3/16"	1/16"	14.21 Ft.	10.66 Ft.

A heavier duty 28 oz. duck belt with 1/4" top rubber cover x 1/32" bottom rubber cover belt having 3500# to 4000# average cover tensile, 20# to 24# average friction pull. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

Width	Ply	List Price	Sale Price
18"	4	$5.67 foot	$4.20 foot
20"	4	6.22 foot	4.61 foot
24"	4	7.32 foot	5.41 foot
24"	5	8.53 foot	6.31 foot

Other widths, plies, duck weights and cover thicknesses. Available at low prices. Write for Free Sample.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:			
14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded. Rubber Disc Impact Idlers priced from $61.00. Write For Bulletin#1138.

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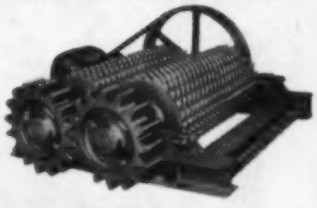

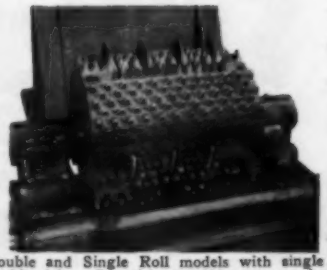

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(C&W) 4—12BU 8E Joy Loaders, Rebuilt
(C) 1—8BU 500 Volt DC
(W) 1—8BU 11G, 220/440 V. AC
(C&W) 2—8BU 250 Volt DC
(W) 3—Myers Whaley #3 Trask Mtd.
(W) 1—5BC Joy Shuttle Car, Rebuilt
(C) 2—8BC Joy Shuttle Cars
(C) 3—32D Joy Shuttle Cars
(W) 2—32E7 Joy Shuttle Cars
(W) 3—32E10 Joy Shuttle Cars, Rebuilt
(C) 1—Lee Norse Shuttle Car
(C) 1—29U Jeffrey, Rubber Mtd.
(C) 4—PL11 Joy Elevators
(W) 4—40 H.P. Acme Self Propelled Air Compressors, Permissible

CONVEYORS

(W) 1—36" Belt Conveyor, 2000', Almost New—Barber Green
(W) 2000'—30" Conveyor Belting, Good Condition
(C&W) 4—26" Hewitt-Robbins & Joy Belt Conveyors—Complete
(W) 3—55A Goodman, 24", Conveyors, Approximately 500'
(C&W) 15—61AM, 61EW, 61HG & 61W Jeffrey Chain Conveyors
(W) 4—19" Joy Chain Conveyors-Permissible
(C) 3—26" Joy Chain Conveyors
(C&W) 6—G12½, G15 & G20 Goodman Shakers —AC & DC
(W) 1—PT12 Long Piggyback Conv.
(W) 1—PT15 Long Piggyback Conv.
(W) 32—Goodman Power Duckbills, Model 477, G1½
(W) 7—UN17 Ladel Shaker Conv.
(C) 1—600' Jeffrey Button Rope Conveyor
(W) 1—250', 40" Scraper Conveyor
(W) 7—Tipple Bolts: 20", 24", 30", 36" & 40" —Any Length
(W) 1—45' Center, Bucket Elevator 8"x5"x5½" Buckets
(W) 1—33' Drag Conveyor, 10" Wide
(W) 1—40' Scraper 24"x8½" Flights
(W) 1—56' Scraper 30"x8" Flights
(W) 1—84' Flight Conveyor, 22"x2½" Flights
(W) 1—88' Drag Conv. 30"x8½" Flights
(W) 1—51' Drag Conv. 24"x6" Flights
(W) 1—30' Drag Conv. 11"x1½" Flights
(W) 2—42"x35' Loading Booms
(C) 1—42"x32' Loading Boom
(C) 1—48" Loading Boom

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(C&W) 4—7AU Track Mtd. Sullivans
(W) 4—7B Sullivans
(W) 10—11B Sullivans, 35 & 50 H.P.
(C) 1—12G3 Goodman 220/440 Volt
(C&W) 10—12AB & 12AA Standard Good.
(W) 2—112AA Goodmans
(W) 2—212AA Baby Goodmans
(C) 1—212G3 Baby Goodman 220/440 V.
(W) 1—312G3, 220/440 V. AC-Rebuilt
(C) 2—412 CA Goodmans
(W) 6—512 Goodmans
(C) 2—712 Goodmans
(C) 1—824 Goodman, 42" T.G.
(C) 1—1224 Goodman, Rubber Mtd.
(W) 1—29C Jeffrey Arc Wall
(C) 1—29U Jeffrey 220/440 Volt 42" T.G.—Excellent
(C&W) 25—35B & 35BB Jeffreys, As Is or Rebuilt, with stub axle trucks
(C) 1—35B Jeffrey, 220/440 Volt
(C) 1—35L Jeffrey
(C) 1—Lot Machine Trucks for Jeffrey & Goodman

LOCOMOTIVES

(W) 1—4 Ton Ironton, 42" T.G., 23" High, Rebuilt
(W) 1—4 Ton, 8-30 Goodman, 36" T.G. 23" High
(W) 2—4 Ton Goodmans, 36" T.G.
(C) 2—4 Ton MH66 Jeffrey
(C) 1—4 Ton MH12 Jeffrey
(W) 1—6 Ton MH150 Jeffrey, Rebuilt 42" T.G., 25" High
(W) 14—6 Ton MH88 Jeffreys, 42" & 44" T.G.
(W) 5—6 Ton HM809 G.E., 36", 42" or 44" T.G.
(W) 5—6 Ton HM823 G.E., 42" or 48" T.G.
(W) 4—6 Ton HM835 G.E.
(W) 1—6 Ton, G.E. Battery Locomotive—A-1 Now
(C&W) 3—6 Ton, 3314T Goodmans, 36" x 48" T.G.
(C&W) 2—6 Ton, 904 Westinghouse
(C&W) 4—8 ton MH100 Jeffreys, 36" & 42" T.G.
(W) 4—8 Ton HM819 G.E., 48" T.G.
(W) 2—8 Ton HM831 G.E., 48" T.G., 27" High
(W) 1—8 Ton Goodman, 36" T.G.
(W) 2—10 Ton HM78, 44" T.G.
(C) 1—10 Ton West., 48" T.G.
(C) 1—13 Ton MH110 Jeffroy, 42" T.G.
(W) 1—Lot Trucks, Gears, & Armatures for most of these locomotives

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(W) 51—36" T.G. Drop Bottoms
(W) 100—36" T.G. Rotary Dumps, 42" High
(C) 16—42" T.G. End Dumps
(W) 230—42" T.G. End Dumps, Various Sizes
(W) 33—44" T.G., Drop Bottoms, 10 Ton
(W) 206—44" T.G. Drop Bottoms, Various Sizes
(W) 385—44" T.G. End Dumps, Various Makes & Sizes
(W) 355—48" T.G., S.D., Drop Bottoms
(W) 56—48" T.G. Rotary Dumps, 8 Ton
(C) 150—48" T.G. Rotary Dumps

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(W) 1—150KW, Rotary, 2300/4000, Completely Automatic
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(C) 1—150KW, West. MG Set, 200 V.
(W) 1—150KW, GE, MG Set, 1200RPM, 2200 Volt, 275 DC
(C) 1—200KW HCC6, GE Rotary, 2300/4000 V. 275 DC
(W) 1—150KW, HCC6, GE Rotary, 2300/4000
(W) 1—150KW Rotary Armature
(W) 1—200KW Rotary Armature

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(W) 1—5x16 Allis-Chalmers, Ripe-Flo Double Deck Vibra cr
(W) 2—American Coal Cleaning Stoker Tables
(W) 1—American Coal Cleaning Carbon Table

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1—G. E., 8 ton, type 822 Locomotive, 44" Ga.
3—G. E., 10 ton, type 800 Locomotives, 42", 44" and 48" Ga.
1—Goodman, 4 ton, 8-30 Locomotive, 22" above rail.
1—Goodman 6 ton Locomotive, 28" high.
2—Goodman type 33, 6 ton, 44" and 48" Ga.
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2—Jeffrey 35L's, on low vein trucks.
15—Jeffrey 35B's and 35BB's
2—Jeffrey 29B's on track.
2—Jeffrey 29C's, track mounted.
1—Jeffrey 29L, on track, perfect.
2—Sullivan CR-10's, 15" high.

LOADING MACHINES

17—Joy Loaders, all types.
2—Jeffrey 6ICLR's on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Myers Whaley No. 3, Automat Loaders.
3—Clarkson Loaders, 26" above rail.

CONVEYORS

3—Joy MTB-30" Conveyors, 1000'.
1—Joy MTB-30" Conveyor, 500'.
2—Joy 30" Belt Conveyors, 10 to 15 H.P.
3,000' Conveyor Belt, 30".
8—Jeffrey 61AM Room Conveyors, 300 ft.
10—Jeffrey 61HG Face Conveyors.
2—61EW Elevating Conveyors.
2—61WH, 15" Room Conveyors, 300 ft.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.
3—Long 400 DBH 18" Chain Conveyors, 25 H.P. Motor—new.

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3—100KW, G. E. TCC-6's, 275 volt, Rotary Converters.
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***Indicates more product information may be found in company advertising appearing in COAL AGE 1956 Mid-July Mining Guidebook and Buying Directory Issue. Check your Guidebook index.**

Acker Drill Co., Inc. 254
Acme Machinery Co. 244
*Aeroquip Corp. 192
Alemite div. Stewart Warner Corp. 249
*Allegheny-Ludlom Steel Corp. 60
*Allis-Chalmers General Products div. Insert between pp. 36-37
Allis-Chalmers Construction Machinery div. 42, 138-139
*American Brattice Cloth Co. 212
*ACF Industries, Inc., American Car & Foundry Co. Third Cover
American Cable div. American Chain & Cable Co. 197
*American Cyanamid Co. 217
*American Mine Door Co. 168
*American Mine Supply Co. 278
American Oil Co. 199
*American Pulverizer Co. 262
*American Steel & Wire div. 50, 57, 169
*Anaconda Wire & Cable Co. 255
Armstrong-Bray & Co. 250
Ashland Oil Co. 219
Austin Powder Co. 52

Barber-Greene Co. 51
Bearings, Inc. 241
Bemis Bro. Bag Co. 210
Bethlehem Steel Co. 24, 36
Bird Machine Co. 4
*Bixby-Zimmer Engineering Co. 154
Boston Woven Hose & Rubber Co. 251
*Bowdil Co. 263
Bucyrus-Erie Co. 257

*Cardox Corp. 44-45
Caterpillar Tractor Co. 151, 162, 288
*Centrifugal & Mechanical Industries, Inc. 171
*Cheatham Electric Switching Device Co. 278
Chevrolet div. General Motors 204
Chicago Pneumatic Tool Co. 147
*Cincinnati Mine Machinery Co. 230
Cities Service Oil Co. 195
Clark Equipment Co. 38-39
*Collyer Insulated Wire Co. 240
Colorado Fuel & Iron Corp. 18
*Columbia-Geneva Steel div. 13, 50, 57, 169
*Combustion Engineering Co. 242
*Compton, Inc. 196

*Daniels Co., Inc. 10
*Dart Truck Co. 277
*Davey Compressor Co. 222
*Denver Equipment Co. 198
*Detroit Diesel Engine div. General Motors Corp. 227
Differential Steel Car. Co. 206
Dodge div. Chrysler Corp. 273
Dodge Manufacturing Corp. 258
Dorr-Oliver, Inc. 32-33
duPont de Nemours & Co., E. I. (Elastomers div.) 37
duPont de Nemours & Co., E. I. (Explosives div.) 207
Durakool, Inc. 194

Elreco Corp. 256
Ensign-Bickford Co. 68
Ensign Electric Co. 234
*Enterprise Wheel & Car Co. 267
Esso Standard Oil Co. 191
*Exide Industrial div. Electric Storage Battery Co. 264

Fairbanks, Morse & Co. 259
Fairmont Machinery Co. 163, 201
Femco, Inc. 214
Fletcher & Co., J. H. 15
Flexible Steel Lacing Co. 216
Flood City Brass & Electric Co. 158
Fuel Process Co. 231
Fuller Manufacturing Co. 237

*Gates Rubber Co. 156
General Cable Co. 213
General Electric Co. 46-47, 143
General Electric Co. (Construction Materials div.) 245
General Tire & Rubber Co. 221
Goodman Manufacturing Co. 26-27
Goodrich Industrial Products Co., B. F. 1
Goodrich Tire Co., B. F. div. B. F. Goodrich Co. 149
Gruendler Crusher & Pulverizer Co. 250
Gulf Oil Corp. 181
*Gundlach Machine Co., T. J. 203
Guyan Machinery Co. 252

Hamilton Rubber Co. 235
*Harnischfeger Corp. 58-59
*Hendrick Manufacturing Co. 256
Hercules Powder Co. 220
Heyl & Patterson, Inc. 223
Hough Co., Frank G. 253
Huber-Warco Co. 270
Hulburt Oil & Grease Co. 2-3

International Harvester Co. (Drott Manufacturing Co.) 23
International Harvester Co. (Payhaulers) 30-31, 183
International Harvester Co. (Trucks) 34-35

Jeffrey Manufacturing Co. 20-21, 176, 215
Johns-Manville Corp. 160
Jones & Laughlin Steel Corp. 43
Joy Manufacturing Co. 66-67, 202, 209

Kaiser Aluminum & Chemical Corp. 184-185
Kennametal, Inc. 131
Koehring Co. 54-55

Lee-Norse Co. 16
*LeRoi div. Westinghouse Air Brake Co. 56
Leschen Wire Rope div. H. K. Porter Co., Inc. 226
*LeTourneau-Westinghouse Co. 17, 19
Linatex Co. of America 228
Link-Belt Co. Fourth Cover
Long Co. 48-49, 287
Lubriplate div. Fiske Bros. Refining Co. 233
*Ludlow Saylor Wire Cloth Co. 236
Lukens Steel Co. 157

Mack Trucks 218
Manhattan Rubber div. 247
Manning Co., Chas E. 194
Manitowoc Engineering Corp. 275
Marietta Concrete Corp. 212
*McLanahan & Stone Corp. 155
*McNally Pittsburg Manufacturing Corp. 178
*Merrick Scale Manufacturing Co. 252
Metal Carbides Corp. 276
*Mine Safety Appliances Co. Second Cover
Mining Progress, Inc. 64
*Morris Machine Works 174

*Nachod & United States Signal Co., Inc. 278
*National Malleable & Steel Castings Co. 63
National Mine Service Co. 40-41
National Tube div. 169
*Nolan Co. 159
*Nordberg Manufacturing Co. 61

Ohio Brass Co. 187
Okonite Co. 173

*Page Engineering Co. 271
*Paris Manufacturing Co. 238
Parker Appliance Co. 274
Pattin Manufacturing Co. 276
Penn Machine Co. 170
Post-Glover Electric Co. 172
*Prox Co., Inc., Frank 179
Pure Oil Co. 175

Quaker Rubber div. H. K. Porter Co., Inc. 224

Raybestos-Manhattan, Inc. 247
*Reich Bros. Manufacturing Co. 193
Reynolds Metals Co. 167
*Roberts & Schaefer Co. 272
Roebling Sons Corp., John A. 165
*Rome Cable Corp. 133, 135, 137
Ryerson & Son, Inc., Joseph T. 6

*Salem Tool Co. 25
Scandinavia Belting Co. 22
Schroeder Bros. 180
Searchlight Section 280-285
Simplex Wire & Cable Co. 62-63
Sinclair Refining Co. 211
SKF Industries, Inc. 229
Socony Mobil Oil Co. 152-153
Spencer Chemical Co. 268
*Stamler Corp., W. R. 166
Standard Oil Co. of Indiana 14
Stardrill-Keystone Co. 177
Stearns Magnetic, Inc. 266
Sutphen, Peter O. 254

*Templeton, Kenly & Co. 274
*Tennessee Coal & Iron div. 13, 50, 57, 169
*Texas Co. 8-9
Thermoid Co. 265
Thurman Machine Co. 274
Timken Roller Bearing Co. 205

Union Wire Rope Co. 144-145
Union Switch & Signal div. Westinghouse Air Brake Co. 269
United States Rubber Co. (Mechanical Goods div.) 141
United States Rubber Co. (Tire Dept.) 28-29
*United States Steel Corp. 13, 50, 57, 169
*United States Steel Export Co. 13, 50, 57, 169

Vanderbilt Co., R. T. 202
Vascoloy-Ramet Corp. 161
*Victaulic Co. of America 200

*Wedge-Wire Corp. 182
West Virginia Works Connors Steel div. H. K. Porter Co. 225
*Western Machinery Co. 248, 279
Whitmore Manufacturing Co. 164
White Diesel Engine div. White Motor Co. 243
Wickwire Spencer Steel div. Colorado Fuel & Iron Corp. 18
Wilcox Manufacturing Co. 53
Wild Heerbrugg Instruments, Inc. 190
Wilfley Manufacturing Co. 239
Wilmot Engineering Co. 189

PROFESSIONAL SERVICES 280

CLASSIFIED ADVERTISING
F. J. Eberle, Business Mgr.

EMPLOYMENT OPPORTUNITIES 281
SPECIAL SERVICES 281
BUSINESS OPPORTUNITIES 281
NOTICES 285
EQUIPMENT
(Used or Surplus New)
For Sale 281-285
WANTED
Equipment 281

ADVERTISERS INDEX

Acme Industrial Equipment, Inc. 281
Bonded Scale & Machine Co. 283
Dugger Electric Equipment Co. 282
Electric & Machine Supply Co. 282, 284
Electric Equipment Co. 282
Electric Service Co. 282
Fish, J. T. 285
Foster, L. B. 282
Frank, M. K. 285
Greensburg Machine Co. 284
Helmick & Associates 281
Howells, Thomas 281
Industrial Machine & Electric Co. 284
Ironton Engine Co. 285
Lefton Industrial Co. 284
McClung, Inc., S. B. 284
Memphis Equipment Co. 282
Midwest Steel Corp. 284
Morse Bros. Machinery Co. 284
Perini Corp. 281
Reese Coal Co. 284
Swabb Equipment Co., Inc., Frank 281, 284
Widon Co. 281
Weisz Co., David 285
Wershow Co., Milton J. 285

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Zacherl Coal Co., Oil City, Pa., is using a new CAT* D9 Tractor and No. 9S Bulldozer with tilt cylinder to strip a 40-foot layer of sandstone overburden. In this tough material the big power, weight and traction of the D9 really prove themselves. And the added ability to tilt the blade quickly from side to side gives an important plus in digging action.

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Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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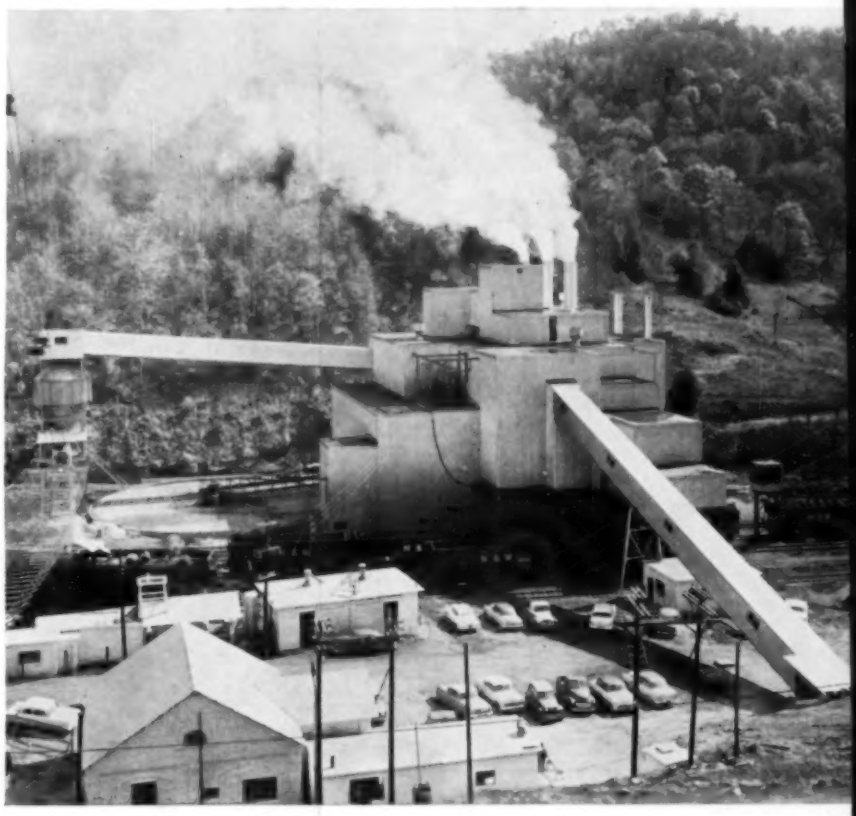

SLOPE BELT CONVEYOR from Moss Mine No. 2 has 600-tph capacity. Conveyor carries R.O.M. coal from primary crusher underground to Clinchfield preparation plant.

LINK-BELT

COAL PREPARATION AND HANDLING MACHINERY

LINK-BELT COMPANY: Chicago 9, Birmingham 3, Cleveland 15, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Louisville 2, Pittsburgh 13, Seattle 4, St. Louis 1, Scarboro (Toronto 13), Springs (South Africa). 14,588

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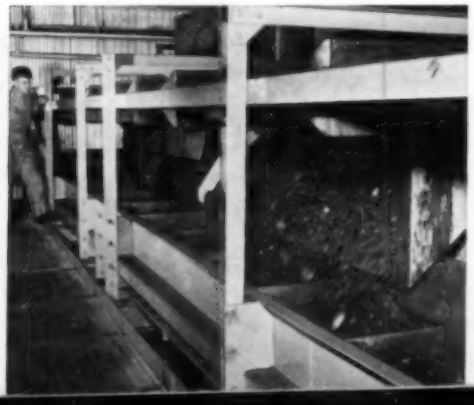
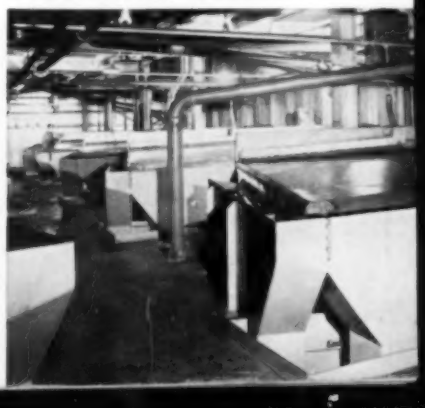
RAW COAL FLIGHT CONVEYOR—36 in. wide—delivers coal from wet vibrating screens to a Link-Belt primary heavy-media Float-Sink Concentrator. Conveyor carries coal up 42-ft. incline.



FINE COAL CONCENTRATING TABLES process the minus ¼-in. coal which is not cleaned in the Link-Belt heavy-media Concentrator vessel. Link-Belt utilized 20 of these tables in the Clinchfield plant.